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MAGAZINE

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ISAAC ASIMOV

THE GODS THEMSELVES

Galaxy

The Best in Pertinent Science Fiction

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Galaxy
SCIENCE FICTION

MAGAZINE

ALL STORIES NEW

March-April 1972 **Vol. 32, No. 5**

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Cover by GAUGHAN, suggested by THE GODS THEMSELVES

GALAXY MAGAZINE is published bimonthly by UPD Publishing Corporation, a subsidiary of Universal Publishing & Distributing Corporation, Arnold E. Abramson, President. Main offices: 235 East 45 Street, New York, N.Y. 10017. 75¢ per copy. 12-issue subscription: $9.00 in the United States, elsewhere $10.00. Second class postage paid at New York, N.Y. and additional mailing offices.

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EDITOR'S PAGE

If—during a duologue on science fiction in January, 1971 (please mark the date) -Robert Silverberg had not happened to mention an impossible isotope, Plutonium-186, and . . .

If Isaac Asimov had not happened to be in the audience to hear him. . .

. . . Then you wouldn't now be on to the first publication anywhere of *The Gods Themselves*, a profoundly wise novel beginning in this issue of *Galaxy*—virtually on the anniversary of the remark that launched it.

If—the companion magazine of *Galaxy*—will carry part two of *The Gods Themselves* in order to enable us to make available to you the entire work before hardcover publication—and also for another and deeper reason.

You and I live on the edge of imponderables and each move we make—or fail to make—creates circumstances that never existed before. Usually these remain unnoticed or at least unsung unless our two worlds either jostle or join or we find ourselves poised over an abyss of our own making. Then, suddenly, *if* can become the longest word in the language.

The Gods Themselves came to be written, by the author's own account, because he felt challenged to put Plutonium-186 to work, once the unworkable concept had been introduced against all the laws of Earthly science. The project began as a short story but as it unfolded Dr. Asimov found that he had to create a whole new Universe to contain the outlaw chemical.

Part two of the book is set entirely in this alternate or parallel Universe, where you and I would be as impossible as Plutonium-186 is in the cosmos we inhabit. Dr. Asimov's para-Universe is meticulously based in solid science, though nothing in it obeys the laws of our cosmos.

So that section truly belongs in *If—The Magazine of Alternatives*, which is governed by laws of the imagination—as valid as the human mind.

Part three, on the other hand, which again is ruled by the science of our cosmos—though not exactly that of Earth—will appear in the next issue of *Galaxy*—a magazine similarly ruled.

● Has it occurred to you recently that if we continue our currently rapacious, civilized course you and I, by best available estimates, will represent the sole remaining mammalian life forms left on the planet by the year 2000?

Man may be the least objectively studied mammal on Earth. We cloak ourselves in aspirations and under this cover—apparently while looking the other way—have made ourselves possibly the major natural force threatening not only the planet but ourselves.

The word for what we live by is Overkill.

Reader Cy Chauvin of Roseville, Michigan, points to a trend in recent science fiction in an excel-

lent letter in *Directions* (see page 176).

Without disagreeing with Mr. Chauvin I would like to put up for grabs the thought that the workings not only of the human mind but also of the mindless human chemistry have begun to assume a devastating importance. And that science fiction is moving—not toward mainstream but through it to the position of leadership it has traditionally held in pertinence and significance.

To support this view, may I refer you again to right now and—*The Gods Themselves*?

—JAKOBSSON

THE GODS THEMSELVES will continue in:

(1) *If*, April 1972—on sale February 25.
(2) *Galaxy*, May 1972—on sale March 23.

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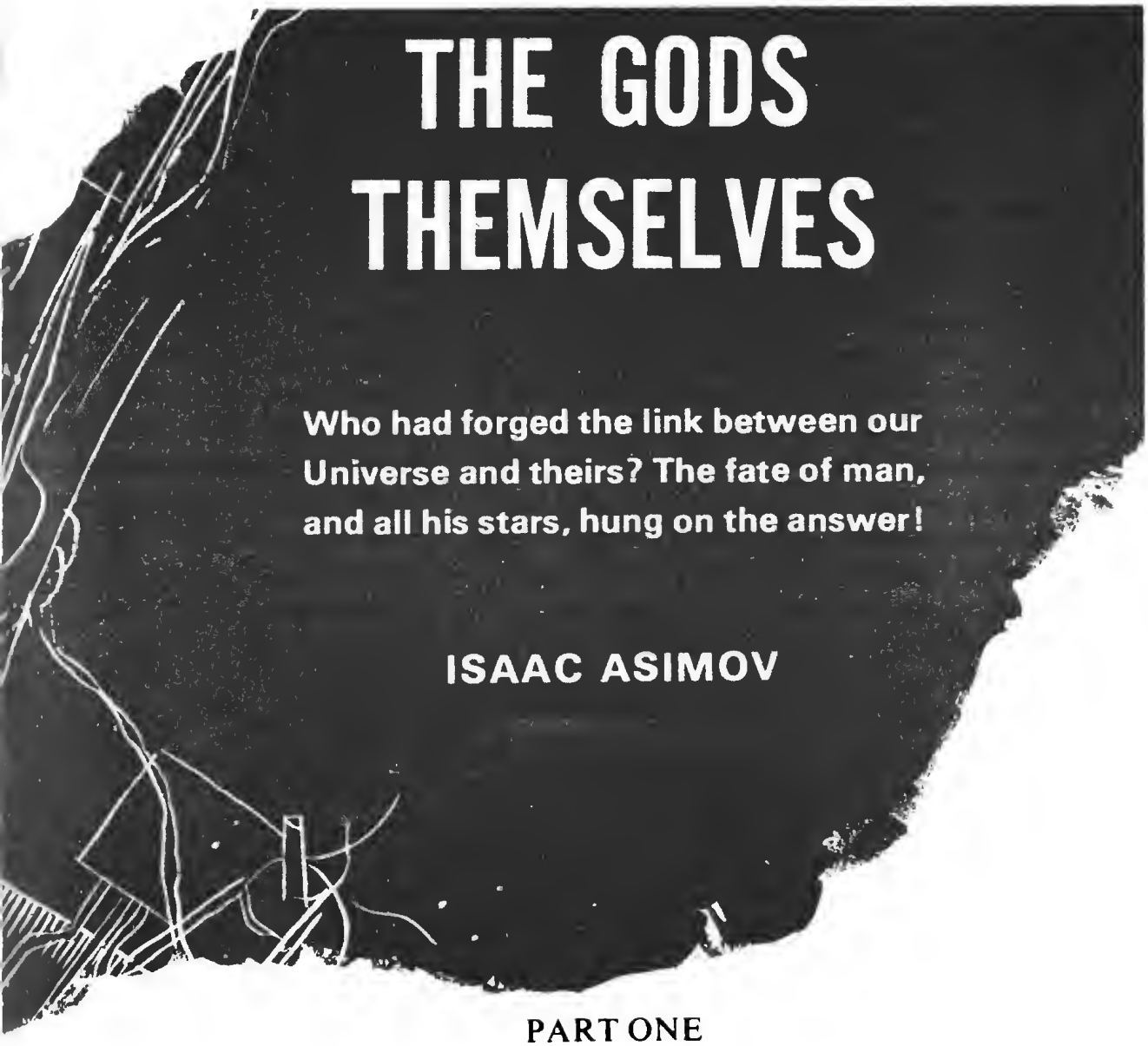


THE GODS THEMSELVES

Who had forged the link between our Universe and theirs? The fate of man, and all his stars, hung on the answer!

ISAAC ASIMOV

PART ONE

"Against stupidity . . ."

6

"NO GOOD," said Lamont sharply. "I didn't get anywhere." He had a brooding look about him that went with his deep-set eyes and the slight asymmetry of his long chin. The look was part of him at the best of times—and this was not the best of times.

His second formal interview with Hallam had been a greater fiasco than the first.

"Don't be dramatic," said Myron Bronowski placidly. "You didn't expect to get anywhere. You told me so." He was tossing peanuts into the air and catching them in his plump-lipped mouth as they came down. He never missed. He was not very tall, not very thin.

"That doesn't make it pleasant. But you're right, it doesn't matter. There are other things I can do and intend to do. Besides, I depend on you. If you could only find out—"

"Don't finish, Pete. I've heard it all before. All I have to do is decipher the thinking of a non-human intelligence."

"A *better*-than-human intelligence. That much I've established. And those creatures in the para-Universe are trying to make themselves understood."

"That may be—" Bronowski sighed—"but they're trying to do it through *my* intelligence, which is better than human I sometimes think, though not much. Sometimes I lie awake in the dark of the night and wonder if different intelligences can communicate at all—or, if I've had a particularly bad day, whether the phrase 'different intelligences' has meaning at all."

"It does," said Lamont savagely, hands clearly balling into fists and bulging his lab-coat pockets. "It means Hallam and me. It means that fools' hero, Dr. Frederick Hallam, versus me. We're different intelligences. I know because when I talk to him he doesn't understand. His idiot face gets redder and his eyes protrude and his ears block. I'd say his mind stops functioning, but I lack the proof that it is ever in any other state."

Bronowski murmured, "What a way to speak of the Father of the Electron Pump."

"That's it. Reputed Father of the Electron Pump. A bastard birth if ever there was one. His contribution was least in substance. I *know*."

"I know, too. You've told me often."

Bronowski tossed another peanut into the air. He didn't miss.

Thirty years earlier, he reflected, Frederick Hallam had been a radiochemist, the print on his doctoral dissertation still wet and he giving no sign whatever of being a world-shaker.

1

WHAT began the shaking of the world was the fact that a dusty reagent bottle marked *Tungsten-186* stood on Hallam's desk. It was not his. He had never used it. It was a legacy from the dim past when for some long-forgotten reason an equally forgotten inhabitant of the office had wanted pure, separated isotope 186 of tungsten instead of the usual mixture of isotopes. The bottle's content was not even really tungsten any more. It consisted of small pellets heavily layered with oxide—gray and dusty. No use to anyone.

And one day Hallam entered the laboratory (well, it was October 3, 2070, to be exact) got to work, stopped shortly before 10 A.M., stared transfixed at the bottle and lifted it. It was as dusty as ever, the label as faded, but he called out, "Goddamn it—who the hell has been tampering with this?"

That, at least, was the account of Denison, who overheard the remark and who repeated it to Lamont a generation later. The official saga of the discovery, as reported in the books, leaves out the phraseology. From history one gets the impression of a keen-eyed chemist aware of change—and instantly drawing deep deductions.

Not so. Hallam had no use for the tungsten. It was of no value and any tampering with it could be of no possible importance to him. However, it had once been costly and had become something of a status symbol to him. Also, he hated any interference with his desk (as so many do) and he suspected others of possessing keen desires to engage in such interference out of sheer malice.

No one at the time admitted to knowing anything about the matter. Benjamin Allan Denison, who had overheard the initial remark, had an office immediately across the corridor and both his and Hallam's doors were open. He looked up and met Hallam's accusatory eye.

He did not particularly like Hallam (no one particularly did) and Denison had slept badly the night before. He was, as it happened and as he later recalled, rather pleased to have someone on whom to vent spleen. Hallam made the perfect candidate.

When Hallam held the bottle up to his face Denison pulled back with clear distaste. "Why the devil should I be interested in your tungsten?" he demanded. "Why should anyone? If you'll look at the bottle you'll see that the thing hasn't been opened for twenty years—and if you hadn't put your own grubby paws on it you would have seen no one has touched it."

Hallam flushed a slow, angry red. He said tightly, "Listen, Denison, someone has changed the contents. That's not the tungsten."

Denison allowed himself a small

but distinct sniff. "How would *you* know?"

Of such things—petty annoyances and aimless thrusts—is history made.

It would have been an unfortunate remark in any case. Denison's scholastic record, as fresh as Hallam's, was far more impressive and he was the bright young man of the department. Hallam knew this and, what was worse, Denison knew it, too, and made no secret of his awareness. Denison's *How would you know?* with the clear and unmistakable emphasis on the *you* was ample motivation for all that followed. Without it Hallam would never have become the greatest and most revered scientist in history, to employ the exact phrase Denison later used in his interview with Lamont.

Officially Hallam had come in on that fateful morning, noticed the dusty gray pellets gone—not even the dust on the inside surface of the bottle remaining—and clear iron-gray metal in their place. Naturally he investigated. . .

But place the official version to one side. It was Denison, who supplied Hallam's real motivation. Had Denison confined himself to a simple negative—or a shrug—the chances are that Hallam would have asked others, would eventually have wearied of the unexplained event, would have put the bottle to one side and let subsequent tragedy, whether subtle or drastic (depending on how long the ultimate discovery was delayed), guide the future. In any event, it would not have been Hallam who rode the whirlwind to the heights.

With Denison's, "How would *you* know?" cutting him down to size, however, Hallam could only retort wildly, "I'll *show* you that I know."

And after that nothing could prevent him from going to extremes. The analysis of the metal in the old container became his number-one priority, and his prime goal became to wipe the haughtiness from Denison's thin-nosed face and the perpetual trace of a sneer from his pale lips.

DENISON never forgot that moment—or that it was his own remark that drove Hallam to the Nobel Prize and himself to oblivion. He was to discover that there was an overwhelming stubbornness in Hallam, the mediocrity's frightened need to safeguard his pride, that would carry the day against all Denison's native brilliance.

Hallam moved at once and directly. He carried his pellets to the mass spectrography department. For a radiation chemist the move was natural. He knew the technicians, had worked with them, and he was forceful. He was forceful to such an effect, indeed, that the job was placed ahead of pro-

jects of much greater pith and moment.

The mass spectrographer said eventually, "Well, it isn't tungsten."

Hallam's broad and humorless face wrinkled into a harsh smile. "All right. We'll tell that to bright-boy Denison. I want a report and—"

"But wait a while, Dr. Hallam. Give us a little time. I'm telling you it's not tungsten, but that doesn't mean I know what it is."

"What do you mean you don't know what it is?"

"I mean the results are ridiculous." The technician thought for a moment. "Impossible, actually. The charge-mass ratio is all wrong."

"All wrong in what way?"

"Too high. It just can't be."

"Well, then," said Hallam and—regardless of the motive that was driving him—his next words set him on the road to the Nobel Prize and with some justice, "get the frequency of its characteristic x-radiation and figure out the charge. Don't just sit around and talk about something being impossible."

It was a troubled technician who came into Hallam's office a few days later.

Hallam ignored the look on the other's face—he was never sensitive—and said, "Did you find—" He cast an uneasy glance at Denison, who was sitting at the desk in his own lab across the hall. Hallam shut his office door. "Did you find the nuclear charge?"

"Yes, but it's wrong."

"All right, Tracy. Do it over."

"I did it over a dozen times. It's still wrong."

"If you made a measurement, that's it. Don't argue with facts."

Tracy rubbed his ear and said, "I've got to, Doc. If I take the measurements seriously—then what you've given me is plutonium-186."

"Plutonium-186? *Plutonium*-186?"

"The charge is +94. The mass is 186."

"But that's impossible. There's no such isotope. There can't be."

"That's what I'm saying to you. But those are the measurements."

"But a situation like that leaves the nucleus over fifty neutrons short. You can't have plutonium-186. You couldn't squeeze 94 protons into one nucleus with only 92 neutrons and expect it to hang together for even a trillion-trillionth of a second."

"That's what I'm telling you, Doc," said Tracy patiently.

And then Hallam stopped to think. It was tungsten he was missing and tungsten-186 was stable. Tungsten-186 had 74 protons and 112 neutrons in its nucleus. Could something have turned twenty neutrons into twenty protons? Surely that was impossible.

"Are there any signs of radioactivity?" asked Hallam, groping

somehow for a road out of the maze.

"I thought of that," said the technician. "It's stable. Absolutely stable."

"Then it can't be plutonium-186."

"I keep telling you, Doc."

Hallam said, hopelessly, "Well, give me the stuff."

ALONE once more, he sat and looked at the bottle in stupefaction. The most nearly stable isotope of plutonium was plutonium-240, where 146 neutrons were needed to make the 94 protons stick together with some semblance of partial stability.

What could he do now? It was beyond him and he was sorry he had started. After all, he had real work begging to be done, and this thing—this mystery—had nothing to do with him. Tracy had made some stupid mistake or the mass-spectrometer was out of whack or. . .

Well, what of it? Forget the whole thing.

Except that Hallam knew he would not be allowed to forget. Sooner or later Denison would be bound to stop by and, with that irritating half-smile of his, ask about the tungsten. Then what could Hallam say?

He could say, *It isn't tungsten, just as I told you.*

Surely Denison would ask, *Oh, and what is it, then?*

And nothing imaginable could make Hallam expose himself to the kind of derision that would follow any claim that it was plutonium-186. He had to find out what it was and he had to do it himself. Clearly he could trust no one.

So about two weeks later he entered Tracy's laboratory in what can fairly be described as a first-class fury.

"Hey, didn't you tell me that stuff was non-radioactive?"

"What stuff?" asked Tracy automatically—before he remembered.

"That stuff you called plutonium-186," said Hallam.

"Oh. Well, it *was* stable."

"About as stable as your mental state. If you call this non-radioactive, you belong in a plumber's shop."

Tracy frowned. "Okay, Doc. Pass it over and let's try." And then he said, "Beats me! It is radioactive. Not much, but it is. I don't see how I could have missed that."

"And how far can I trust your nonsense about plutonium-186?"

The matter had Hallam by the throat now. The mystery had become so exasperating as to be a personal affront. Whoever had switched bottles, or switched contents, must either have switched again or devised a metal for the specific purpose of making a fool of him. In either case he was ready to pull the world apart, if necessary, to solve the puzzle . . .

He had his stubbornness and an intensity of drive that could not easily be brushed aside. He went straight to G. C. Kantrowitsch, who was then in the final years of his own rather remarkable career. Kantrowitsch's aid was difficult to enlist but, once enlisted, it quickly caught fire.

Two days later, in fact, Kantrowitsch was storming into Hallam's office in a blaze of excitement. "Have you been handling this thing? Think! Well, answer, will you?"

"Not much," said Hallam.

"Well, don't. It's emitting positrons."

"Oh?"

"The most energetic positrons I've ever seen. And your figures on its radioactivity are low."

"Too low?"

"Distinctly. And what bothers me is that every measurement I take is just a trifle higher than the one before."

6 (continued)

BRONOWSKI came across an apple in the capacious pocket of his jacket and bit into it. "Okay, you've seen Hallam and been kicked out as expected. What next?"

"I haven't quite decided. But whatever it is, it's going to dump him on his fat behind. I saw him once before, you know—years ago when I first came here—when I thought he was a great man. A great man? He's the greatest villain in the history of science. He's rewritten the history of the Pump, you know, rewritten it here—" Lamont tapped his temple. "He believes his own fantasy and fights for it with a diseased fury. He's a pygmy with only one talent, the ability to convince others he's a giant."

Lamont looked at Bronowski's wide and placid face, wreathed now in amusement, and forced a laugh. "Oh, well, *that* doesn't do any good—and I've told it all to you before anyway."

"Many times," agreed Bronowski.

"But it just gravels me to have the whole world—"

2

PETER LAMONT had been two years old when Hallam had picked up his altered tungsten for the first time. When he was twenty-five he joined Pump Station One, the print on his own doctoral dissertation still fresh, and accepted a simultaneous appointment to the distinguished physics faculty of the University.

It was a remarkably satisfactory achievement for the young man.

Pump Station One lacked the glitter of later stations but it was the grandaddy of them all, of the entire chain that now girdled the planet, though the entire technology was only a couple of decades old. No major technological advance had ever caught hold so rapidly—and why not? The Pump meant free and limitless energy without pollution problems. It was both the Santa Claus and the Aladdin's Lamp of the whole world.

Lamont had taken the job in order to delve into problems of the highest theoretical abstraction—yet he found himself growing vitally interested in the amazing story of the development of the Electron Pump. It had never been written up in its entirety by anyone who truly understood the theoretical principles (in so far as they could be understood) and who had some ability in translating the Pump's complexities for the general public. To be sure, Hallam himself had written a number of articles for the popular media, but these did not represent a connected, reasoned history—something that Lamont yearned to supply.

He used Hallam's articles to begin with, other reminiscences in published form—the official documents, so to speak—carrying them through to Hallam's world-shaking remark, the Great Insight, as it was often called (invariably with capital letters).

Afterward, of course, when Lamont had experienced his disillusionment, he began digging deeper and the question arose in his mind as to whether Hallam's great remark had really been Hallam's. It had been advanced at the seminar that marked the true beginning of the Electron Pump and yet, as it turned out, it was extraordinarily difficult to get the details of that seminar and quite impossible to get the voice recordings.

Eventually Lamont began to suspect that the dim footprints left on the sands of time by that seminar were not entirely accidental. Putting several items ingeniously together, he found reasonable evidence that one John F. X. McFarland had said something very much like the crucial statement Hallam had made—and had done so before Hallam.

He went to see McFarland, who was featured not at all in the official accounts and who was now doing upper-atmosphere research, with particular reference to the solar wind. His was not a top-echelon job, but it had its perquisites and it had more than a little to do with Pump effects. McFarland had clearly avoided suffering the fate of oblivion that had overtaken Denison.

He was polite enough to Lamont and willing to talk on any subject except the events of that seminar. Those he simply didn't remember.

Lamont insisted, quoted the per-

suasive evidence he had gathered.

McFarland took out a pipe, filled it, inspected its contents thoroughly and said with an odd intentness, "I don't choose to remember because it doesn't matter—it really doesn't. Suppose I laid claim to having said something. No one would believe it. I would look like an idiot—and a megalomaniacal one."

"And Hallam would see to it that you were retired?"

"I'm not saying that, but I don't see that it would do me any good. What's the difference anyway?"

"A matter of historical truth," said Lamont.

"Oh, bull. The historical truth is that Hallam never let go. He drove everyone into investigating, whether they wanted to or not. Without him that tungsten would eventually have exploded—with I don't know how many casualties. There might never have been another sample and we might never have had the Pump. Hallam deserves the credit for it even if he doesn't deserve the credit. And I can't help it if that doesn't make sense. History often doesn't make sense."

Lamont was not satisfied with McFarland's answer but he had to make it do. McFarland simply would say no more.

Historical truth?

One piece of historical truth that seemed beyond question was that it was the radioactivity that pulled

opening of our Spring '72. So for openers we have a brand new book on H.P. Lovecraft—Lin Carter's thoughtful **A Look Behind the Cthulu Mythos**. *Lovecraft devotees may be annoyed since this is no volume of slavish adulation.*

●

FEBRUARY *is strong on adult fantasy, with a new Clark Ashton Smith collection,* **Xiccarph** *(our wholesalers wanted to know how you pronounce these titles—we told them* **Cthulhu** *is an aspirated spit and* **Xiccarph** *is the French "G" assisted by a slight bronchial condition. We do like to keep abreast of these intellectual side issues.) However, they recognized* **The Lost Continent**, *with enormous relief, as being about Atlantis. This, they said, everybody knows about—and furthermore it will add 15,000 copies to the sale if you put Atlantis on the cover. So we did. Having thus met the demands of commerce, let us add that this novel, by C. J. Cutliffe Hyne, is one of the best we have read on the subject.*

●

JOHN MORGAN and DAN KIPPAX *continue the saga of Venturer XII in* **Seed of Stars**, *this one with genetic problems on a galactic scale. Really fine space opry. We've just signed the third one in the series, in our opinion the best of the lot—but don't miss the in-between either.* **BB**

"Hallam's tungsten" (this is what it was called as a matter of historical custom) into the big time. It didn't matter whether it was or was not tungsten, whether it had or had not been tampered with—even whether it was or was not an impossible isotope. Everything was swallowed up in the miraculousness of something—anything—that showed a constantly increasing intensity of radioactivity under circumstances that ruled out the existence of any type of radioactive breakdown in any number of steps then known.

After a while Kantrowitsch muttered, "We'd better spread it out. If we keep it in sizable lumps it will vaporize or explode, or both, and contaminate half the city."

So it was powdered and scattered and mixed with ordinary tungsten at first. Then, when the tungsten grew radioactive in its turn, it was mixed with graphite which had a lower cross-section to the radiation.

Less than two months after Hallam noticed the change in the bottle's contents Kantrowitsch, in a communication to the editor of *Nuclear Reviews*, with Hallam's name appended as co-author, announced the existence of plutonium-186. Tracy's original determination was thus vindicated but his name was not mentioned, either then or later. With that, Hallam's tungsten began to receive epic attention, and Denison began to note the changes that ended by

making him into a non-person.

The existence of plutonium-186 was bad enough. For it to have been stable at the start and to display a curiously increasing radioactivity was much worse.

A seminar to handle the problem was organized. Kantrowitsch was in the chair—an interesting historical note, for it was the last time in the official saga of the Electron Pump that a major meeting was held in connection with it and chaired by anyone but Hallam. As a matter of fact, Kantrowitsch died five months later and the only personality with sufficient prestige to keep Hallam in the shade was removed.

THE meeting was extraordinarily fruitless until Hallam announced his Great Insight. But in the version as reconstructed by Lamont the real turning point came during the luncheon break. At that time McFarland, who is not credited with any remarks in the official records, although he was listed as an attendee, said, "You know, what we need is a little bit of fantasy here. Suppose—"

He was speaking to Diderick van Klemens and Van Klemens reported the conversation sketchily in a kind of personal shorthand in his own notes. Long before Lamont had succeeded in tracking that down Van Klemens was dead. And though the notes convinced Lamont himself that the Great Insight had not originated with Hallam, he had to admit they would not add up to a convincing story by themselves. There was no way of proving that Hallam had seen them or had overheard McFarland's remarks to Van Klemens. Lamont would have been willing to bet a fortune that Hallam had been within earshot of the conversation but that willingness proved nothing.

And then, suppose Lamont could prove his point. The revelation might hurt Hallam's egregious pride, but it could not really shake his position. It would be argued that to McFarland the remark was only fantasy—it was Hallam who accepted it as something more. It was Hallam who was willing to stand up in front of the group and say it officially and risk the derision that might be his. McFarland would surely never have dreamed of placing himself on official record with his "little bit of fantasy."

Lamont might have counterargued that McFarland was a well-known nuclear physicist with a reputation to lose, while Hallam was a young radiochemist who could say anything he pleased in nuclear physics and, as an outsider, get away with it.

In any case, this is what Hallam said, according to the official transcript:

"Gentlemen, we are getting nowhere. I am therefore going to make a suggestion, not because it

necessarily makes sense, but because it represents less nonsense than anything else I've heard. We are faced with a substance, plutonium-186, that cannot exist at all, let alone as an even momentarily stable substance, if the natural laws of the Universe have any validity. It follows, then, that since it does indubitably exist and did exist as a stable substance to begin with, it must have existed—at least to begin with—in a place or at a time or under circumstances where the natural laws of the Universe were other than they are. To put it bluntly, the substance we are studying did not originate in our Universe at all, but in another—an alternate Universe—a parallel Universe. Call it what you want.

"Once here—and I don't pretend to know how it got across whatever boundaries separate us—it was stable still and I suggest that this was because it carried the laws of its own Universe with it. The fact that it slowly became radioactive and then even more radioactive may mean that the laws of our own Universe slowly soaked into its substance, if you know what I mean.

"I point out that at the same time that the plutonium-186 appeared, a sample of tungsten, made up of several stable isotopes, including tungsten-186, disappeared. It may have slipped over into the parallel Universe. After all, it is logical to suppose that it is simpler for an exchange of mass to take place than for a one-way transfer to occur. In the parallel Universe, tungsten-186 may be as anomalous as plutonium-186 is here. It may begin as a stable substance and slowly become increasingly radioactive. It may serve as an energy source there just as plutonium-186 would here."

The audience must have been listening with considerable astonishment for there is no record of interruption, at least until the sentence last recorded above, at which time Hallam seemed to have paused to catch his breath and perhaps to wonder at his own temerity.

Someone from the audience (presumably Antoine-Jerome Lapin, though the record is not clear) asked if Professor Hallam were suggesting that an intelligent agent in the para-Universe had deliberately made the exchange in order to obtain an energy source. The expression "para-Universe"—evolved apparently as an abbreviation of "parallel-Universe"—thus entered the language. This question contained the first recorded use of the expression.

There was a pause and then Hallam, more daring than ever, said—and this was the nub of the Great Insight—"Yes, I think so, and I think that the energy source cannot be made practical unless Universe and para-Universe work together, each at one end of a pump, pushing

energy from them to us and from us to them, taking advantage of the difference in the natural laws of the two Universes."

HALLAM had adopted the word "para-Universe" and made it his own at this point. Furthermore, he became the first to use the word "pump" (since invariably capitalized) in connection with the matter.

A tendency exists in the official account to give the impression that Hallam's suggestion caught fire at once, but it did not. Those who were willing to discuss it at all would commit themselves no further than to say it was an amusing speculation. Kantrowitsch, in particular, did not say a word. This was crucial to Hallam's career.

Hallam could scarcely carry through the theoretical and practical implications of his own suggestion all by himself. A team was required and it was built up. But no member of the team, until it was too late, would associate himself openly with what was to become known as the Great Insight. By the time success was unmistakable the public had grown to think of it as Hallam's and Hallam's alone. It was Hallam, to all the world, and Hallam alone, who had discovered the substance, experienced and transmitted the Great Insight—and it was Hallam who was the Father of the Electron Pump.

Thus, in various laboratories, pellets of tungsten metal were laid out temptingly. In one out of ten the transfer was made and new supplies of plutonium-186 were produced. Other elements were offered as bait and refused. But wherever the plutonium-186 appeared and whoever it was that brought the supply to the central research organization working on the problem, to the public it was an additional quantity of "Hallam's tungsten."

Again it was Hallam who presented some aspects of the theory to the public most successfully. To his own surprise (as he later said) he found himself a facile writer and he enjoyed popularizing. Besides, success has its own inertia and the public would accept information on the project from no one but Hallam. In a since famous article in the *North American Sunday Tele-Times Weekly*, he wrote:

> We cannot say in how many ways the laws of the para-Universe differ from our own, but we can guess with some assurance that the strong nuclear interaction, which serves to bind the nuclei of atoms together and which is the strongest known force in our Universe, is even stronger there; perhaps a hundred times stronger. This means that in the para-Universe protons are more easily held together against their own electrostatic repulsion and

that a nucleus requires fewer neutrons to produce stability.

Plutonium-186, stable in their Universe, contains far too many protons—or too few neutrons—to be stable in ours with its weaker nuclear interaction. Plutonium-186, once in our Universe, begins to radiate positrons, particles similar to electrons except for having a positive instead of a negative charge. With each positron emitted, a proton within the nucleus is converted to a neutron. Eventually twenty protons per nucleus have been converted to neutrons and plutonium-186 has become tungsten-186, which is stable by the laws of our Universe.

Since opposite charges attract, the twenty positrons combine with twenty electrons, resulting in the annihilation of both positrons and electrons. Their mass is totally converted to energy—far safer and more efficient than either atomic fission or fusion. But with every atom of plutonium-186 sent to us, our Universe ends up with twenty fewer electrons.

Meanwhile, the tungsten-186 that enters the para-Universe is unstable there for the opposite reason. By the laws of the para-Universe it has too many neutrons or too few protons. The tungsten-186 nuclei begin to emit electrons and with each emitted electron a neutron changes to a proton until, in the end, it is plutonium-186 again. With each tungsten-186 nucleus sent into the para-Universe, twenty more electrons are added to it.

The plutonium/tungsten can make its cycle endlessly back and forth between Universe and para-Universe, yielding energy first in one and then in another, the net effect being a transfer of twenty electrons from our Universe to theirs per each nucleus cycled. Both sides can gain energy from what is, in effect, an Inter-Universe Electron Pump.

The conversion of this notion into reality and the actual establishment of the Electron Pump as an effective energy source proceeded with amazing speed and every stage of its success enhanced Hallam's prestige.

3

LAMONT had no reason to doubt the basis of that prestige and it was with a certain hero worship (the memory of which quite embarrassed him later and which he strove—with some success—to eliminate from his mind) that he first applied for a chance to interview Hallam at some length in connection with the history he was planning.

Hallam seemed amenable. In thirty years his position in public esteem had become so lofty one might wonder why his nose did not bleed. Physically he had aged impressively, if not gracefully. There was a ponderousness to his body that gave him the appearance of circumstantial weightiness and if his face were gross in its features he seemed able to give them the air of a kind of intellectual repose. He still reddened readily and the easily bruised nature of his self-esteem was a byword.

Hallam had undergone some quick briefing before Lamont's entrance. He said, "You are Dr. Peter Lamont and you've done good work, I'm told, on para-theory. I recall your paper. On para-fusion, wasn't it?"

"Yes, sir."

"Well, refresh my memory. Tell me about it. Informally, of course, as though you were talking to a layman. After all—" he chuckled here—"in a way I'm a layman. I'm just a radiochemist, you know—and no great theoretician unless you want to count a few concepts now and then."

Lamont accepted this at the time as a straightforward statement and, indeed, the speech may not have been as obscenely condescending as he later insisted on remembering it to have been. It was typical though—as Lamont later found out or at least maintained—of Hallam's method of grasping the essentials of the work done by others. He could talk briskly about the subject thereafter without being overly particular, or particular at all, about assigning credit.

But the younger Lamont of the time was rather flattered. He plunged ahead at once with that voluble eagerness one experiences when one is explaining one's own discoveries. "I can't say I did much, Dr. Hallam. Deducing the laws of nature of the para-Universe—the para-laws—is a tricky business. We don't have much to go on. I started from what little we know and assumed no new departures that we had no evidence for. It seems obvious that with a stronger nuclear interaction, the fusion of small nuclei would take place more readily."

"Para-fusion," said Hallam.

"Yes, sir. The trick was simply to work out what the details might be. The mathematics involved was somewhat subtle but once a few transformations were made, the difficulties tended to melt away. It turns out, for instance, that lithium hydride can be made to undergo catastrophic fusion at temperatures four orders of magnitude lower there than here. It takes fission-bomb temperatures to explode lithium hydride here, but a mere dynamite charge, so to speak, would turn the trick in the para-Universe. Just possibly lithium hydride in the para-Universe could

be ignited with a match, but that's not very likely. We've offered them lithium hydride, you know, since fusion power might be natural for them, but they won't touch it."

"Yes, I know that."

"It would clearly be too risky for them—like using nitroglycerin in ton lots in rocket engines—only worse."

"Very good. And you are also writing a history of the Pump?"

"An informal one, sir. When the manuscript is ready I will ask you to read it, if I may, so that I might have the benefit of your intimate knowledge of events. In fact, I would like to take advantage of some of that knowledge right now if you have a little time."

"I can make some. What is it you want to know?" Hallam was smiling. It was the last time he ever smiled in Lamont's presence.

"The development of an effective and practical Pump, Professor Hallam, took place with extraordinary speed," began Lamont. "Once the Pump Project—"

"The Inter-Universe Electron Pump Project," corrected Hallam, still smiling.

"Yes, of course," said Lamont, clearing his throat. "I was merely using the popular name. Once the project started, the engineering details were developed with great rapidity and with little waste motion."

"That is true," said Hallam, with a touch of complacence. "People have tried to tell me that the credit was mine for vigorous and imaginative direction, but I wouldn't care to have you overstress that in your book. The fact is that we had an enormous fund of talent in the project, and I wouldn't want the brilliance of individual members to be dimmed by any exaggeration of my role."

Lamont shook his head with a little annoyance. He found the remark irrelevant. He said, "I don't mean that at all. I mean the intelligence at the other end—the para-men, to use the popular phrase. They started it. We discovered them after the first transfer of plutonium for tungsten—but they discovered us first in order to make the transfer, working on pure theory and without the benefit of the kind of hint they gave us. And there's the iron foil they sent across—"

Hallam's smile had now disappeared—and permanently. He was frowning as he said loudly, "The symbols were never understood. Nothing about them—"

"The geometric figures were understood, sir. I've looked into it, and it is quite clear that they were directing the geometry of the Pump. It seems to me that—"

Hallam's chair moved back with an angry scrape. He said, "Let's not have any of that, young man. We did the work, not they."

"Yes—but isn't it true that they—"

"That they *what?*"

Lamont became aware now of the storm of emotion he had raised, but he could not understand its cause. Uncertainly he said, "That they are more intelligent than we—that they did the real work? Is there any doubt of that, sir?"

Hallam, red-faced, had heaved himself to his feet. "There is every doubt," he shouted. "I will not have mysticism here. There is too much of that. See here, young man —" he advanced on the still seated and thoroughly astonished Lamont and shook a thick finger at him— "if your history is going to take the attitude that we were puppets in the hands of the para-men it will not be published from this institution—or at all—if I have my way. I will not have mankind and its intelligence downgraded and I won't have para-men cast in the role of gods."

Lamont had no choice but to leave, a puzzled man, utterly upset at having created harsh feeling where he had wanted to sow only good will.

And then he found that his historical sources were suddenly drying up. Those who had been loquacious enough a week earlier now remembered nothing and had no time for further interviews.

Lamont was irritated at first. Then a slow anger began to build within him. He looked at what he had from a new viewpoint, and now he began to squeeze and insist where earlier he had merely asked. When he met Hallam at department functions Hallam frowned and looked through him, and Lamont began to look scornful in his turn.

The net result was that Lamont found his prime career as para-theoretician beginning to abort and he turned more firmly than ever toward his history.

6 (continued)

"THAT damned fool," muttered Lamont reminiscently. "You had to be there, Mike, to see him go into panic at any suggestion that it was the other side that was the moving force. I look back on it and I wonder—how was it possible to meet him, however casually, and not know he would react that way. Just be grateful you never had to work with him."

"I am," said Bronowski, indifferently, "though there are times when you're no angel."

"Don't complain. With your sort of work you have no problems."

"Also no interest. Who cares about my sort of work except myself

and five others in the world. Maybe six others—if you remember."

Lamont remembered. "Oh, well," he said.

4

BRONOWSKI'S placid exterior never fooled anyone who grew to know him even moderately well. He was sharp and he worried a problem until he had the solution or until he had it in such tatters that he knew no solution was possible.

Consider the Etruscan inscriptions on which he had built his reputation. The tongue had been a living one until the first century A.D., but the cultural imperialism of the Romans had left nothing behind, so the language had vanished completely. What inscriptions survived the carnage of Roman hostility and—worse, indifference—had been written in Greek letters and could be pronounced, but nothing more. The language seemed to have no relationship to any of the surrounding ones, seemed archaic and not even Indo-European.

Bronowski noted that another language existed that seemed to have no relationship to any of the surrounding languages, that seemed quite archaic and not even Indo-European—but one very much alive and spoken in a region not far from where once the Etruscans had lived.

What of the Basque language? Bronowski wondered. And he used Basque as his guide.

So much for inspiration. The rest was hard work, for Basque, an extraordinarily difficult language in itself, was only the loosest of helps. Bronowski found more and more reason, as he went on, to suspect some cultural connection between the inhabitants of early northern Italy and early northern Spain. He could even make out a strong case for a broad swatch of pre-Celts filling western Europe with a language of which Etruscan and Basque were dimly related survivors. In two thousand years, however, Basque had evolved and had become more than a little contaminated with Spanish. To try first to reason out its structure in Roman times and then relate it to Etruscan was an intellectual feat of surpassing difficulty and Bronowski utterly astonished the world's philologists when he triumphed.

The Etruscan translations themselves were marvels of dullness and had no significance whatever. They were routine funerary inscriptions for the most part. The fact of the translation, however, was stunning and, as it turned out, it proved of the greatest importance to Lamont.

Not at first. To be perfectly

truthful about the matter, the translations had been a fact for nearly five years before Lamont had as much as heard that there once were such people as the Etruscans. But then Bronowski came to the University to give one of the annual Fellowship Lectures and Lamont, who usually shirked the duty of attending that fell on the faculty members, did not shirk it this time.

He heard the lecture, not because he recognized its importance or felt any interest in it whatever, but because he was dating a graduate student in the Department of Romance Languages and his choices were listening to Bronowski or going to a music festival he particularly wanted to avoid.

The social connection was a feeble one, scarcely satisfactory from Lamont's point of view and only temporary, but it did get him to the talk.

He rather enjoyed it, as it happened. The dim Etruscan civilization entered his consciousness for the first time as a matter of distant interest and the problem of solving an undeciphered language struck him as fascinating. When young, he had enjoyed solving cryptograms, but had put them away with other childish things in favor of the much grander cryptograms posed by nature, so that he ended in para-theory.

Yet Bronowski's talk took him back to the youthful joys of making slow sense of what seemed a random collection of symbols, combined with sufficient difficulty to add great honor to the task. Bronowski was a cryptogrammatist on the grandest scale, and it was the description of the steady encroachment of reason upon the unknown that Lamont enjoyed.

All would yet have gone for nothing—the triple coincidence of Bronowski's appearance on campus, Lamont's youthful cryptogrammic enthusiasm, the social pressure of an attractive young lady—were it not for the fact that Lamont saw Hallam the following day and placed himself firmly and, as he eventually found, permanently, in the doghouse.

Within an hour of the conclusion of that interview, Lamont determined to see Bronowski. The issue at hand was the very one that had seemed so obvious to himself and that had so offended Hallam. Because it brought down censure on him, Lamont felt bound to strike back—and in connection with the point of censure specifically. The para-men *were* more intelligent than man. Lamont had believed it before in a casual sort of way as something more obvious than vital. Now it had become vital. It must be proved and the fact of it forced down the throat of Hallam—sideways, if possible, and with all the sharp corners exposed.

Already Lamont found himself so far removed from his so-recent

hero worship that he relished the prospect.

BRONOWSKI was still on campus. Lamont tracked him down and insisted on seeing him.

Bronowski was blandly courteous when finally cornered.

Lamont acknowledged the courtesies brusquely, introduced himself with clear impatience and said, "Dr. Bronowski, I'm delighted to have caught you before you left. I hope that I will persuade you to stay here even longer."

Bronowski said, "That may not be hard. I have been offered a position on the University faculty."

"And you will accept the position?"

"I am considering it. I think I may."

"You must. You will, when you hear what I have to say. Dr. Bronowski, what is there for you to do now that you've solved the Etruscan inscriptions?"

"That is not my only task, young man." (He was five years older than Lamont.) "I'm an archeologist and there is more to Etruscan culture than its inscriptions and more to pre-classical Italic culture than the Etruscans."

"But surely nothing as exciting for you—and as challenging—as the Etruscan inscriptions?"

"I grant you that."

"So you would welcome something even more exciting, even more challenging—and something a trillion times as significant as those inscriptions."

"What have you in mind, Dr.—Lamont?"

"We have inscriptions that are not part of a dead culture or part of anything on Earth—or part of anything in the Universe. We have something called para-symbols."

"I've heard of them. For that matter, I've seen them."

"Surely, then, you have had the urge to tackle the problem, Dr. Bronowski? You have had the desire to work out what they say?"

"No desire at all, Dr. Lamont, because there's no problem."

Lamont stared at him suspiciously, "You mean you can read them?"

Bronowski shook his head. "You mistake me. I mean I can't possibly read them, nor can anyone else. There's no base. In the case of Earthly languages, however dead, there is always the chance of finding a living language—or a dead language already deciphered—that bears some relationship to it, however faint. Failing that, there is at least the fact that any Earthly language was written by human beings with human ways of thought. That makes a starting point, however feeble. None of this is the case with the para-symbols—so that they constitute a problem that clearly has no solution. An insolubility is not a problem."

Lamont had kept himself from

interrupting only with difficulty. Now he burst out with: "You are wrong, Dr. Bronowski. I don't want to seem to be teaching you your profession but you don't know some of the facts that my own profession has uncovered. We are dealing with para-men concerning whom we know hardly anything. We don't know what they are like, how they think, what kind of world they live on—we have data on almost nothing, however basic and fundamental. So far you are right."

"But it's only *almost* nothing that you know, is that it?" Bronowski did not seem impressed. He took a package of dried figs from his pocket, opened it and began to eat. He profferred it to Lamont, who shook his head.

Lamont said, "Right. We do know one thing of crucial importance. They are more intelligent than we are. Item one: they can make the exchange across the inter-Universe gap, while we can play only a passive role." He interrupted himself here to ask, "Do you know anything about the Inter-Universe Electron Pump?"

"A little," said Bronowski. "Enough to follow you, Doctor, if you don't get technical."

Lamont hastened on. "Item two: They sent us instructions as to how to set up our part of the pump. We couldn't understand the device but we could make out the diagrams sufficiently well to give us the necessary hints. Item Three: They can somehow sense us. At least they can become aware of our leaving tungsten for them to pick up, for instance. They know where it is and can act upon it. We can do nothing comparable. There are other points but these are enough to show the para-men to be clearly more intelligent than we are."

Bronowski said, "I imagine, though, that you are in the minority here. Surely your colleagues don't accept this."

"They don't. But what makes you come to that conclusion?"

"Because you're clearly wrong, it seems to me."

"My facts are correct. And since they are, how can I be wrong?"

"You are merely proving that the technology of the para-men is more advanced than ours. What has technology to do with intelligence? See here—"

BRONOWSKI rose to take off his jacket and then sat down in a half-reclining position, the soft rotundity of his body seeming to relax and crease in great comfort as though physical ease helped him think.

"About two and a half centuries ago the American naval commander, Matthew Perry, led a flotilla into Tokyo harbor. The Japanese, until then isolated, found themselves faced with a technology considerably beyond their own and decided it was unwise to risk

resistance. An entire warlike nation of millions was helpless in the face of a few ships from across the sea. Did that prove that Americans were more intelligent than the Japanese—or merely that Western culture had taken a different turning? Clearly the latter, for within half a century the Japanese had successfully imitated Western technology and within another half-century they were a major industrial power despite the fact that they were disastrously beaten in one of the wars of the time."

Lamont listened gravely and said, "I've thought of your point, too, Dr. Bronowski, though I didn't know about the Japanese—I wish I had the time to read history. Yet the analogy is wrong. The para-men's is more than technical superiority—it's a matter of difference in degree of intelligence."

"How can you tell, aside from guessing?"

"Because of the mere fact that they sent us directions. They were eager for us to set up our part of the Pump—they *had* to have us do it. They could not physically cross over—"

He paused for breath, feeling himself to be too excited, too eager. He mustn't oversell his case.

Bronowski regarded him curiously. "All right, they sent us messages. What are you trying to deduce from that?"

"That they expected us to understand. Could they be such fools as to send us rather intricate messages, in some cases quite lengthy, if they knew we would not understand? Except for their diagrams we would have ended nowhere. Now if they *had* expected us to understand, it could only be because they felt that any creatures like ourselves with a technology roughly as advanced as their own (and they must have been able to estimate that somehow—another point in favor of my belief) must also be roughly as intelligent as they are and would experience little difficulty in working out something from their symbols."

"They might also be reasoning from naivete," said Bronowski, unimpressed.

"You mean they think there is only one language, spoken and written—and that another intelligence in another Universe speaks and writes as they do? Come on!"

Bronowski said, "Even if I were to grant your point, what do you want me to do? I've looked at the para-symbols—I suppose every archeologist and philologist on Earth has. I don't see what I can do and neither, I'm sure, does anyone else. No progress has been made in over twenty years."

Lamont said intensely, "What's true is that in twenty years there has been no desire for progress. The Pump Authority does not want to solve the symbols."

"Why shouldn't it want to?"

"Because of the annoying possibility that communication with the para-men *will* demonstrate them to be distinctly more intelligent than we are. Because human beings might be shown to be the puppet-partners in connection with the Pump to the hurt of their ego. And, specifically—" Lamont strove to keep venom out of his voice—"because Hallam would lose the credit of being the Father of the Electron Pump."

"Suppose the Authority *did* want to make progress. What could be done? The will is not the deed, you know."

"It could get the para-men to cooperate. It could send messages to the para-Universe. This has never been done, but such attempts would be feasible. A message on metal foil might be placed under a pellet of tungsten."

"Oh? Are they still looking for other tungsten, even with the Pumps in operation?"

"No." Lamont frowned. With the Pumps in full operation enough energy was apparently being delivered in the para-Universe to meet all requirements. Then he shrugged. "No—but I think we can assume that they're curious. If we borrow one of the small experimental Pump field generators and put a pellet of tungsten in that with a message—it should attract their attention. If they take the message and make any sense of it, even the slightest, they'll send back one of their own. They might set up an equivalence table of their words and ours—or they might use a mixture of their words and ours. It will be a kind of alternate push, first their side, then ours, then theirs again—and so on."

"With their side," said Bronowski, "doing most of the work."

"Yes."

Bronowski shook his head. "No fun in that, is there? It doesn't appeal to me."

Lamont flared, "Not enough in it for you? What did you get out of the Etruscan inscriptions, damn it? You beat out five others in the world. Maybe six. With them you're a success and they hate you. What else? You go about lecturing on the subject before audiences amounting to a few dozen and they forget your name the day after. Is that what you're really after?"

"Don't be dramatic."

"All right. I won't be. I'll get someone else. It may take longer but, as you say, the para-men will do most of the work anyway. If necessary, I'll do it myself."

"Have you been assigned this project?"

"No, I haven't. What of it? Or is that another reason you don't want to get involved? Disciplinary problems? There is no law against attempting translation and I can always place tungsten on my desk. I will not choose to report any

messages I get in place of the tungsten and to that extent I will be breaking the research code. Once the translation is made, who will complain? Would you work with me if I guaranteed your safety and kept your part in it secret. You would lose your fame but you may value your security more. Oh, well—" Lamont shrugged. "If I do it myself I'll have the advantage of not having to worry about someone else's security."

He rose to go. Both men were angry and bore themselves with that stiff-legged courtesy one assumes when addressing someone who is hostile but still mannerly.

"I presume," said Lamont, "you will at least treat this conversation as confidential."

Bronowski was on his feet, too. "Of that you may be assured," he said coldly and the two shook hands briefly.

LAMONT did not expect to hear from Bronowski again. He even began the process of talking himself into believing it would be better for him to handle the translation effort on his own.

Two days later, however, Bronowski was at Lamont's laboratory. He said rather brusquely, "I'm leaving the city now, but I'll be back in September. I'm taking the position here and, if you're still interested, I'll see what I can do about the translation problem you mentioned."

Lamont had barely time for a surprised expression of thanks before Bronowski stalked off, apparently angrier at having given in than at having resisted.

They became friends in time—and in time Lamont learned what had brought Bronowski around. The day after their discussion, Bronowski had had lunch at the Faculty Club with a group of the higher officials of the University, including, of course, the president. Bronowski had announced that he would accept the position and send in a formal letter to that effect in due time and all had expressed gratification.

The president had said, "It will be quite a feather in our cap to have the renowned translator of the Itascan Inscriptions here at the University. We are honored."

The malapropism had gone uncorrected, of course, and Bronowski's smile, though strained, did not actually waver. Afterward the head of the Department of Ancient History explained the president to be more of a Minnesotan than a Classical scholar and since Lake Itasca was the point of origin of the mighty Mississippi, the slip of the tongue had been a natural one.

But in combination with Lamont's sneer at the extent of his fame Bronowski found the expression rankling.

When Lamont finally heard the story he was amused. "Don't go

on," he said. "I've been down that road, too. You said to yourself, 'By God, I'll do something even *that* knot-head will have to get straight.' "

"A little like that," said Bronowski.

5

A YEAR'S work, however, had netted them very little. Messages had finally gone across to the para-men—messages had come back. Nothing of consequence had been revealed.

"Just make a guess!" Lamont had said feverishly to Bronowski. "Any wild guess at all. Try it out on them."

"It's exactly what I'm doing, Pete. What are you so jumpy about? I spent twelve years on the Etruscan Inscriptions. Do you expect this job to take any less time?"

"Good God, Mike. We can't take twelve years."

"Why not? Look, Pete, it hasn't escaped me that there's been a change in your attitude. You've been impossible this last month or so. I thought we had it clear at the start that this work can't go quickly and that we've got to be patient. I thought you understood that I had my regular duties at the University, too. Look, I've asked you this a number of times now. Let me ask again. Why are you in such a hurry?"

"Because I'm in a hurry," said Lamont abruptly. "Because I want to get on with it."

"Congratulations," said Bronowski dryly. "So do I. Listen, you're not expecting an early death, are you? Your doctor hasn't told you you're hiding a fatal cancer?"

"No, no," groaned Lamont.

"Well, then?"

"Never mind," said Lamont. He walked away hurriedly.

When he had first tried to get Bronowski to join forces with him, Lamont's grievance had concerned only Hallam's mean-minded obstinacy concerning the suggestion that the para-men were the more intelligent. It was in that respect and that respect only that Lamont had been striving for a breakthrough. He had intended nothing beyond that—at first.

But in the course of the following months he had been subjected to endless exasperation. His requests for equipment, for technical assistance, for computer time were delayed. His request for travel funds was snubbed. His views at interdepartmental meetings were invariably overlooked.

The breaking point came when Henry Garrison, junior to himself in point of service and definitely so in point of ability, received an advisory appointment, rich in prestige, that by all rights should have gone to Lamont. It was then that Lamont's resentment built

up to the point where merely proving himself right was no longer sufficient. He yearned to smash Hallam, destroy him utterly.

The feeling was reinforced every day, every hour, by the unmistakable attitude of everyone else at the Pump Station. Lamont's abrasive personality did not collect sympathy, but some gave it to him nevertheless.

GARRISON himself was embarrassed. He was a quiet-spoken, amiable young man who clearly wanted no trouble and who now stood in the doorway of Lamont's lab with an expression that had more than a small component of apprehension in it.

He said, "Hey, Pete, can I have a few words with you?"

"As many as you like," said Lamont, frowning and avoiding a direct eye-to-eye glance.

Garrison came in and sat down. "Pete," he said, 'I can't turn down the appointment but I want you to know I didn't push for it. It came as a surprise."

"Who's asking you to turn it down? I don't give a damn."

"Pete. It's Hallam. If I turned it down it would go to someone else, not you. What have you done to the old man?"

Lamont rounded on the other. "What do *you* think of Hallam? What kind of man is he, in your opinion?"

Garrison was caught by surprise. He pursed his lips and rubbed his nose. "Well—" He let the sound fade off.

"Great man? Brilliant scientist? Inspiring leader?"

"Well—"

"Let me tell you. The man's a phony. He's a fraud. He's got this reputation and this position of his and he's sitting there in a panic. He knows that I see through him and that's what he has against me."

Garrison gave a small, uneasy laugh, "You haven't gone up to him and said—"

"No, I haven't said anything directly to him," said Lamont morosely. "Some day I will. And he can tell. He knows I'm one person he isn't fooling even if I don't say anything."

"But Pete, where's the point in letting him know it? I don't say *I* think he's the world's greatest either, but where's the sense in broadcasting it? Butter him up a little. He's got your career in his hands."

"Has he? I've got his reputation in mine. I'm going to show him up. I'm going to strip him."

"How?"

"That's my business," muttered Lamont, who at the moment had not the slightest idea of how.

"But that's ridiculous," said Garrison. "You can't win. He'll just destroy you. Even if he isn't an Einstein or an Oppenheimer, he's more than either to the world in general. He *is* the Father of the

Electron Pump to Earth's two-billion population and nothing you can possibly do will affect them as long as the Electron Pump is the key to human paradise. While that's so Hallam can't be touched and you're crazy if you think he can. What the hell, Pete? Tell him he's great and eat crow. Don't be another Denison!"

"I tell you what, Henry," said Lamont in sudden fury. "Why not mind your own business?"

Garrison rose suddenly and left without a word. Lamont had made another enemy—or at least lost another friend. The price, however, was right, he finally decided, for one remark of Garrison's had set the ball rolling in another direction.

Garrison had said, . . . *as long as the Electron Pump is the key to human paradise . . . Hallam can't be touched. . .*

With that clanging in his mind Lamont, for the first time, turned his attention away from Hallam and placed it on the Electron Pump. *Was* the Electron Pump the key to human paradise? Or was there, by heaven, a catch?

Every blessing in human history had had a catch. What was the catch to the Electron Pump?

The Pump supplied unlimited amounts of almost free power, with no chemical or radioactive wastes. It had made possible the cleaning of pollution from the air and the water and the realization of most of mankind's dreams that had once been economically unfeasible. Now it promised apparently unending prosperity.

PROPERLY speaking, of course, it was not an Electron Pump. It did not Pump electrons, but rather a continuous stream of tungsten-186 atoms in exchange for the equivalent plutonium-186. But since the net effect was to transfer electrons from the Universe to the para-Universe, even most scientists tended to overlook the intermediate steps.

Lamont knew enough of the history of para-theory to know that the matter of "a catch" had not gone unexplored. When it was first announced that the basic overall effect of the Electron Pump was the Pumping of electrons from the Universe to the para-Universe, there had not been wanting those who asked immediately, "But what will happen when all the electrons have been Pumped?"

This was easily answered. At the largest reasonable rate of Pumping the electron supply would last for at least a trillion trillion trillion years—and the entire Universe, together, presumably, with the para-Universe, would not last a tiny fraction of that time.

The next objection seemed more sophisticated. All right, there was no possibility of Pumping away *all* the electrons. But as they were Pumped the para-Universe would gain a net negative charge to repel

others being Pumped, while the Universe would gain a net positive charge to hold the electrons more firmly here. What happened when it took more energy to operate the Pump than could be produced by it?

The para-theorists should have disposed of that quickly. The atoms actually being pumped had a balance of charges to make them neutral. Neutral substances should not be affected by the charge of the Universe.

But it seemed there was a Law of Conservation of the Cussedness of Things. It had already been discovered that the Pump would not work to transfer any substance that was ionized. The increase of a positive charge in the Universe, it was realized, would ionize the neutral atoms by stripping away some of the loosely held orbital electrons around them. Careful mathematical analysis indicated that the effort of Pumping would increase at precisely the same rate as if it had been electrons that were Pumped.

Apparently it did not matter whether the process was considered incorrectly as Pumping electrons or treated with full scientific rigor. The results were the same. With each year, as the difference in charge grew, it would become more difficult to Pump further atoms (or electrons) against the force of the resisting charge-difference.

If the charge concentration remained at the points of Pumping, the effect would stop almost at once but, of course, it didn't. The concentration diffused outward over the Earth and the effect had been calculated with that in mind.

The increased positive charge of the Earth generally forced the positively charged solar wind to avoid the planet at a greater distance and the magnetosphere was enlarged. Thanks to the work of McFarland (the real originator of the Great Insight according to Lamont) it could be shown that a definite equilibrium point was reached as the solar wind swept away more and more of the accumulating positive particles that were repelled from Earth's surface and driven higher into the exosphere. With each increase in Pumping intensity—with each additional Pumping Station constructed—the net positive charge on Earth increased slightly and the magnetosphere expanded by a few miles. The change, however, was minor and the positive charge was, in the end, swept away by the solar wind and spread through the outer reaches of the solar system.

Even so—even allowing for the most rapid possible diffusion of the charge, the time would still come when the local charge-difference between Universe and para-Universe at the points of Pumping would grow large enough to end the process. That would be a small fraction of the time it

would take really to use up all the electrons—roughly, a trillion-trillionth of the time.

But that still meant that Pumping would remain possible for a trillion years. Only a single trillion years, but that was enough—it would suffice. A trillion years was far longer than man or the solar system would last. And if man somehow did last that long (or some creature that was man's successor and supplanter) then no doubt something would be devised to correct the situation. A great deal could be done in a trillion years.

Lamont had to agree to that.

BUT then he remembered something else, a line of thought Hallam himself had dealt with in one of the articles he had written for popular consumption. With some distaste, he dug out the article. It was important to see what Hallam had said, before he carried the matter further.

The article said in part:

> Because of the ever-present gravitational force, we have come to associate the expression 'downhill' with the kind of inevitable change we can use to produce energy we can convert into useful work. It is the water running downhill that, in past centuries, turned wheels that in turn powered machinery such as pumps and generators. But what happens when all the water has run downhill?
>
> No further work can then be possible until the water has been returned uphill—and that takes work. In fact, it takes more work to force the water uphill than we can collect by allowing it to flow downhill. We work at an energy loss. Fortunately the sun does the work for us. It evaporates the oceans so that water vapor climbs high in the atmosphere, forms clouds and eventually falls again as rain or snow. This soaks the ground at all levels, fills the springs and streams and keeps the water forever running downhill.
>
> But not quite forever. The sun can raise the water vapor, but only because, in a nuclear sense, it is running downhill, too. It is running downhill at a rate immensely greater than any Earthly river can manage —and when all of it has run downhill there will be nothing we know of to pull it uphill again.
>
> All sources of energy in our Universe run down. We cannot help that. Everything is downhill in just one direction and we can force a temporary uphill course only by taking advantage of some greater downhill in the vicinity. If we want useful energy forever

we need a road that goes downhill both ways. That is a paradox in our Universe—it stands to reason that whatever is downhill one way is uphill going back.

But need we confine ourselves to our Universe alone? Think of the para-Universe. It has roads, too, that are downhill in one direction and uphill in the other. Those roads, however, don't fit in with our roads. It is possible to take a road from the para-Universe to our Universe that runs downhill and which, when we follow it back from the Universe to the para-Universe runs downhill again—because the two Universes have different laws of behavior.

The Electron Pump takes advantage of a road that is downhill both ways. The Electron Pump . . .

Lamont looked at the title of the piece again. It was: *The Road That Runs Downhill Both Ways.*

He began to think. The concept was, of course, a familiar one to him, as were its thermodynamic consequences. But why not examine the assumptions? That had to be the weak point in any theory. What if the assumptions, assumed to be right by definition, were wrong? What would be the consequences if one started with other assumptions? Contradictory ones?

He started blindly but within a month he had that feeling that every scientist recognizes—the endless clicking of unexpected pieces of the puzzle falling into place as annoying anomalies become anomalous no more.

It was the feel of Truth.

From that moment on he began to put additional pressure on Bronowski.

And one day he said, "I'm going to see Hallam again."

Bronowski's eyebrows lifted. "What for?"

"To have him turn me down."

"Yes, that's about your speed, Pete. You're unhappy if your troubles die down a bit."

"You don't understand. It's important to have him refuse to listen to me. I can't have it said afterward that I bypassed him—that he was ignorant of what I was doing."

"That would make him ignorant of what? Of the translation of the para-symbols? We don't have a translation as yet. Don't jump the gun, Pete."

"No, no, not that." And Lamont would say no more.

HALLAM did not make it easy for Lamont. Some weeks passed before he could find time to see the younger man. Nor did Lamont intend to make it easy for Hallam. He stalked in with every invisible bristle on edge and sharply pointed. Hallam waited for

him frozen-faced, with sullen eyes.

Hallam asked abruptly, "What's this crisis you're talking about?"

"Something's turned up, sir," said Lamont tonelessly, "inspired by one of your articles."

"Oh?" Then, quickly: "Which one?"

"*The Road That Runs Downhill Both Ways*. The one you programed for *Teenage Life*, sir."

"And what about it?"

"I believe the Electron Pump is not downhill both ways, if I may use your metaphor which is not, as it happens, a completely accurate way of describing the Second Law of Thermodynamics."

Hallam frowned. "What have you got in mind?"

"I can explain it best, sir, by setting up the Field Equations for the two Universes, sir, and demonstrating an interaction that until now has not been considered—unfortunately so, in my opinion."

With that Lamont moved directly to the thixo-board and quickly fingered the equations, talking rapidly as he did so.

Lamont knew that Hallam would be humiliated and irritated by such a procedure since he would not follow the mathematics. Lamont counted on that.

Hallam growled, "See here, young man, I have no time now to engage in a full discussion of any aspect of para-theory. You send me a complete report and, for now, if you have some brief statement as to what you're getting at, you may make it."

Lamont walked away from the thixo-board, an unmistakable expression of contempt on his face. He said, "All right. The Second Law of Thermodynamics describes a process that inevitably chops off extremes. Water doesn't run downhill--what really happens is that extremes of gravitational potential are equalized. Water will just as easily bubble uphill if trapped underground. You can get work out of the juxtaposition of two different temperature levels, but the end result is that the temperature is equalized at an intermediate level--the hot body cools down and the cold body warms up. Both cooling and warming are equal aspects of Second Law and, under, the proper circumstances, equally spontaneous."

"Don't teach me elementary thermodynamics, young man. What is it you want? I have very little time."

Lamont said, with no change of expression, no sense of being hurried. "Work is obtained out of the Electron Pump by an equalization of extremes. In this case the extremes are the physical laws of the two Universes. The conditions that make those laws possible, whatever those conditions may be, are being bled from one Universe into the other and the end result of the entire process

will be two Universes in which the laws of nature will be identical —and intermediate as compared with the situation now. Since this will produce uncertain but undoubtedly large changes in this Universe, it would seem that serious consideration must be given to stopping the Pumps and shutting down the whole operation permanently."

It was at this point that Lamont expected Hallam to explode and cut off any chance of further explanation. Hallam did not fail that expectation. He sprang out of his chair, which fell over. He kicked the chair away and took the two steps that separated him from Lamont.

Lamont warily pushed back his own chair and stood up.

"You idiot!" shouted Hallam. "Don't you suppose everyone at the station understands about the equalization of natural law? Are you wasting my time telling me something I knew when you were learning to read? Get out of here—and any time you want to offer me your resignation, consider it accepted."

Lamont left, having obtained exactly what he wanted. And yet he felt himself to be furious over Hallam's treatment of him.

6 (concluded)

"ANYWAY," said Lamont, "it clears the ground. I've tried to tell him. He wouldn't listen. So I take the next step."

"And what is that?" said Bronowski.

"I'm going to see Senator Burt."

"You mean the head of the Committee on Technology and the Environment?"

"The same. You've heard of him?"

"Who hasn't? But where's the point, Pete? What have you got that would interest him? It's not the translation. Pete, I'm asking you once again: what have you got on your mind?"

"I can't explain. You don't know para-theory."

"Does Senator Burt?"

"More than you, I think."

Bronowski pointed his finger. "Pete, let's not kid around. Maybe I know things you don't. We can't work together if we work against each other. Either I'm a member of this little two-man corporation or I'm not. You tell me what's on your mind and I'll tell you

something in exchange. Otherwise, let's stop this altogether."

Lamont shrugged. "All right. If you want it I'll give it to you. Now that I've got it past Hallam, maybe it's just as well. The point is that the Electron Pump is transferring natural law. In the para-Universe the strong interaction is a hundred times what it is here—which means that nuclear fission is much more likely here than there and nuclear fusion is much more likely there than here. If the Electron Pump keeps on long enough, there will be a final equilibrium in which the strong nuclear interaction will be equal in both Universes. That would make it about ten times what it is here now and one-tenth what it is there now."

"Didn't anyone know this?"

"Oh, sure, everyone knew it. It was obvious almost from the start. Even Hallam can see it. That's what got the bastard so excited. I started telling him this in detail, as though I didn't think he had ever heard it before and he blew up."

"But what's the point, then? Is there danger in the interaction's becoming intermediate?"

"Of course. What do you think?"

"I don't think anything. When will it become intermediate?"

"At the present rate, 10^{30} years or so."

"How long is that?"

"Long enough for a trillion trillion Universes like this one to be born, live, grow old and die, one after the other."

"Oh, blazes, Pete. What odds does it make then?"

"Because to reach that figure," said Lamont slowly and carefully, "which is the official one, certain assumptions were made that I think were wrong. And if certain other assumptions are made—which I think are right—we're in trouble now."

"What kind of trouble?"

"Suppose the Earth turned into a whiff of gas in a period of about five minutes. Would you consider that trouble?"

"Because of the Pumping?"

"Because of the Pumping."

"And how about the world of the para-men? Would they be in danger, too?"

"I'm sure of it. A different danger, but danger."

Bronowski stood up and began pacing. He wore his brown hair

thick and long in what had once been called a Buster Brown. Now he was clutching at it. He said, "If the para-men are more intelligent than we are, would they be running the Pump? Surely they would know it was dangerous before we did."

"I've thought of that," said Lamont. "What I guess is that they've started Pumping for the first time and they, like us, got the process started for the apparent good it would bring and worried about consequences later."

"But you say you know the consequences now. Would they be slower than you were?"

"It depends on if and when they look for those consequences. The Pump is too attractive to try to spoil. I wouldn't have looked myself if I hadn't— But what's on *your* mind, Mike?"

Bronowski stopped his pacing, looked fully at Lamont and said, "I think we've got something."

Lamont stared at him wildly, then leaped forward to seize the other's sleeve. "With the para-symbols? Tell me, Mike!"

"It happened while you were with Hallam. While you were actually with Hallam. I haven't known exactly what to do about it, because I wasn't sure what was going on. And now—"

"And now?"

"I'm still not sure. One of their foils came through—with four symbols."

"Oh?"

"In the Latin alphabet. And it can be pronounced."

"What?"

Bronowski produced the foil with the air of a conjurer. Incised on it, quite different from the delicate and intricate spirals and differential glistenings of the para-symbols, were four broad, child-like letters: F-E-E-R.

"What do you suppose that means?" asked Lamont, blankly.

"So far all I've been able to think of is that it's F-E-A-R misspelled."

"Is that why you were cross-examining me? You thought someone on the other side was experiencing fear?"

"And I thought it might have some connection with your own obviously increasing excitement over the last month. Frankly, Pete, I didn't like being kept in the dark."

"Okay. Now let's not jump to conclusions. You're the one with experience with fragmentary messages. Wouldn't you say that the para-men were beginning to experience fear concerning the Electron Pump?"

"Not necessarily," said Bronowski. "I don't know how much they can sense of this Universe. If they can sense the tungsten we lay out for them—if they can sense our presence—perhaps they are sensing our state of mind. Perhaps they are trying to reassure us, tell us there is no reason to fear."

"Then why don't they say N-O F-E-E-R?"

"Because they may not know our language that well."

"Hmm. Then I can't take it to Burt."

"I wouldn't. It's ambiguous. In fact, I wouldn't go to Burt until we get something more from the other side. Who knows what they're trying to say?"

"No, I can't wait, Mike. I *know* I'm right and we have no time."

"All right, but if you see Burt you'll be burning your bridges. Your colleagues will never forgive you. Have you thought of talking to the physicists here? You can't put pressure on Hallam on your own, but a whole group of you—"

Lamont shook his head vigorously. "Not a chance. The men at this station survive by virtue of their jellyfish quality. There isn't one who would stand against him. Trying to rally the others to put pressure on Hallam would be like asking strands of cooked spaghetti to come to attention."

Bronowski's soft face looked unwontedly grim. "You may be right."

"I know I'm right," said Lamont just as grimly.

7

IT HAD taken time to pin the Senator down, time that Lamont had resented losing—the more so since nothing further in Latin letters had come from the para-men. No message of any kind, though Bronowski had sent across half a dozen, each with a carefully selected combination of para-symbols and each incorporating both F-E-E-R and F-E-A-R.

Lamont was unsure of the significance of the half-dozen variations but Bronowski had seemed hopeful.

Yet nothing had happened and

now Lamont was at last in to see Burt.

The Senator was thin-faced, sharp-eyed and elderly. He had been the head of the Committee on Technology and Environment for a generation. He took his job seriously.

He fiddled now with the old-fashioned necktie that he affected (and that had become his trademark) and said, "I can only give you a half-hour, son." He looked at his wristwatch.

Lamont was not worried. He expected to interest Senator Burt enough to make him forget about time limits. He made no attempt to begin at the beginning—Burt had been briefed about the subject matter of the meeting in general.

He said, "I won't bother you with the mathematics, Senator, but I will assume you realize that through Pumping the natural laws of the two Universes are being mixed."

"Stirred together," said the Senator calmly, "with equilibrium coming in about 10^{30} years. Is that the figure?" His eyebrows in repose arched up and then down, giving his lined face a permanent air of surprise.

"It is," said Lamont, "but it is arrived at by assuming that the alien laws seeping into our Universe and theirs spread outward from the point of entry at the speed of light. That is just an assumption and I believe it to be wrong."

"Why?"

"The only measured rate of mixing is within the plutonium-186 sent into this Universe. That rate is extremely slow at first—presumably because matter is dense—and increases with time. If the plutonium is mixed with less dense matter, the rate increases more rapidly. From a few measurements of this sort it has been calculated that the permeation rate would increase to the speed of light in a vacuum. It would take some time for the alien laws to work their way into the atmosphere, far less time to work their way to the top of the atmosphere and then off through space in every direction at 300,000 kilometers per second, thinning into harmlessness in no time."

Lamont paused for a moment to consider how best to go on and the Senator picked it up at once. "However—" he urged in the manner of a man not willing to waste time.

"It's a convenient assumption that seems to make sense and seems to make no trouble—but what if it is not matter that offers resistance to the permeation of the alien laws, but the basic fabric of the Universe itself?"

"What is the basic fabric?"

"I can't put it into words. There is a mathematical expression that I think represents it, but we don't have the words. The basic fabric of the Universe is that which dictates the laws of nature. It is the basic

fabric of our Universe that makes it necessary for energy to be conserved. It is the basic fabric of the para-Universe, with a weave, so to speak, somewhat different from ours, that makes their nuclear interaction a hundred times stronger than ours."

"And so?"

"If it is the basic fabric that is being penetrated, sir, then the presence of matter, dense or not, can have only a secondary influence. The rate of penetration is greater in a vacuum than in dense mass, but not very much greater. The rate of penetration in outer space may be great in Earthly terms but it is only a small fraction of the speed of light."

"Which means?"

"That the alien fabric is not dissipating as quickly as we think, but is piling up, so to speak, within the solar system to a much greater concentration than we have been assuming."

"I see," said the Senator, nodding. "And how long will it be by your estimate, before the space within the solar system is brought to equilibrium? Less than 10^{30} years?

"Far less, sir. Less than 10^{10} years, I think. Perhaps fifty billion years, give or take a couple of billion."

"Not much in comparison, but enough, eh? No immediate cause for alarm, eh?"

"But I'm afraid there *is* immediate cause for alarm, sir. Damage will be done long before equilibrium is reached. Because of the Pumping, the strong nuclear interaction is growing steadily stronger in our Universe at every moment."

"Enough stronger to measure?"

"Perhaps not, sir."

"Not even after twenty years of Pumping?"

"Perhaps not, sir."

"Then why worry?"

"Because, sir, upon the strength of the strong nuclear interaction rests the rate at which hydrogen fuses to helium in the core of the sun. If the interaction strengthens even unnoticeably, the rate of hydrogen fusion in the sun will increase markedly. The sun maintains the balance between radiation and gravitation with great delicacy and to upset that balance in favor of radiation, as we are now doing—"

"Yes?"

"Will cause an enormous explosion. Under our laws of nature it is impossible for a star as small as the sun to become a supernova. Under the altered laws it may not be. I doubt that we would have warning. The sun could build up to a vast explosion and in eight minutes after that you and I will be dead and the Earth will quickly vaporize into an expanding puff of gas."

"And nothing can be done?"

"If it is too late to avoid upsetting the equilibrium—nothing. If it is

not yet too late, then we must stop Pumping."

THE Senator cleared his throat. "Before I agreed to see you, young man, I inquired as to your background since you were not personally known to me. Among those I queried was Dr. Hallam. You know him, I suppose?"

"Yes, sir." A corner of Lamont's mouth twitched but his voice held even. "I know him well."

"He told me," said the Senator, glancing at a paper on his desk, "that you are a trouble-making idiot of doubtful sanity and he demanded that I refuse to see you."

Lamont said in a voice he strove to keep calm. "Are those his words, sir?"

"His exact words."

"Then why have you agreed to see me, sir?"

"Ordinarily, if I received something like this from Hallam I wouldn't have seen you. My time is valuable and heaven knows I see more trouble-making idiots of doubtful sanity than bears thinking of, even among those who come to me with the highest recommendations. In this one case, though, I didn't like Hallam's 'demand.' You don't make demands of a Senator, and Hallam had better learn that."

"Then you will help me, sir?"

"Help you do what?"

"Why—arrange to have the Pumping halted."

"That? Not at all. Quite impossible."

"Why?" demanded Lamont. "You are the head of the Committee on Technology and Environment and it is precisely your task to stop the Pumping—or any technological procedure that threatens irreversible harm to the environment. There can be no greater, no more irreversible harm than is threatened by Pumping."

"Certainly. Certainly—if you are right. But it seems that what your story amounts to is that your assumptions are different from the accepted ones. Who's to say which set of assumptions is right?"

"Sir, the structure I have built explains several things that are left doubtful in the accepted view."

"Well, then, your colleagues ought to accept your modification and in that case you would scarcely have to come to me, I imagine."

"Sir, my colleagues will not believe. Their self-interest stands in the way."

"As your self-interest stands in the way of your believing you might be wrong. Young man, my powers, on paper, are enormous—but I can only succeed when the public is willing to let me. I want to give you a lesson in practical politics."

He looked again at his wristwatch, leaned back and smiled. His offer was not characteristic of him, but an editorial in the *Terrestrial Post* that morning had referred to him as "a consummate politician,

the most skilled in the International Congress" and the glow that the description had aroused in him still lingered.

"It is a mistake," he said, "to suppose that the public wants the environment protected or their lives saved and that they will be grateful to any idealist who will fight for such ends. What the public wants is comfort. We learned that lesson during the environmental crisis of the twentieth century. When it became known that cigarettes increased the incidence of lung cancer the obvious remedy was to stop smoking—but the desired remedy was a cigarette that did not encourage cancer. When it became clear that the internal-combustion engine was polluting the atmosphere dangerously, the obvious remedy was to abandon such engines—and the desired remedy was to develop nonpolluting engines.

"Now then, young man, don't ask me to stop the Pumping. The economy and comfort of the entire planet depend on it. Tell me instead how to keep the Pumping from exploding the sun."

LAMONT said, "There is no way, Senator. We are dealing with something so basic that we can't play with it. We must stop it."

"Ah, and you can suggest only that we go back to matters as they were before Pumping."

"We must."

"In that case you will need hard and fast proof that you are right."

"The best proof," said Lamont stiffly, "is to let the sun explode."

"Why can't you get Hallam to back you up?"

"Because he is a small man who finds himself the Father of the Electron Pump. How can he admit his child will destroy the Earth?"

"I see what you mean, but he is still the Father of the Electron Pump to the whole world and only his word would carry sufficient weight in this respect."

Lamont shook his head. "He would never give in. He would rather see the sun blow up."

The Senator said, "Then force his hand. You have a theory but a theory by itself is meaningless. Surely there must be some way of checking it. The rate of radioactive breakdown of, say, uranium depends on the interactions within the nucleus. Has that rate been changing in a fashion predicted by your theory but not the standard one?"

Again Lamont shook his head. "Ordinary radioactivity depends on the weak nuclear interaction and unfortunately experiments of that sort will yield only borderline evidence. By the time it showed sufficiently to be unmistakable, it would be too late."

"What else, then?"

"There are pion interactions of a specific sort that might yield unmistakable data now. Better still,

there are quark-quark combinations that have produced puzzling results recently that I am sure I can explain—"

"Well, there you are."

"Yes, but in order to obtain that data, I must make use of the large proton synchrotron on the moon, sir, and no time on that will be available for years—I've checked—unless someone pulls the strings."

"Meaning me?"

"Meaning you, Senator."

"Not as long as Dr. Hallam says this about you, son." Senator Burt's gnarled finger tapped the piece of paper in front of him. "I can't get out on that limb."

"But the existence of the world—"

"*Prove* it."

"Override Hallam and I'll prove it."

"Prove it and I'll override Hallam."

Lamont drew a deep breath, "Senator! Suppose there's just a trifling chance I'm right. Isn't even that trifling chance worth being tested out? The results could mean everything for all mankind, the entire planet—"

"You want me to fight the good fight. I'd like to. There's a certain drama in going down in a good cause. Any decent politician is masochistic enough to dream now and then of going down in flames while the angels sing. But, Dr. Lamont, to do that one has to have a fighting chance. One has to have something to fight for that may—just *may*—win out. If I back you on what you've shown so far I'll accomplish nothing. It's your word alone against the infinite desirability of Pumping. Shall I demand that every man give up the personal comfort and affluence he has learned to get used to, thanks to the Pump, just because one man cries doom while all the other scientists stand against him and the revered Hallam calls him an idiot? No, sir. I will not go down in flames for nothing."

Lamont said, "Then just help me find my proof. You needn't appear in the open if you fear—"

"I'm not afraid," said Burt abruptly. "I'm being practical. Dr. Lamont, your half-hour is rather more than gone."

Lamont stared in frustration. Burt's expression was clearly intransigent now. Lamont left.

Senator Burt did not see his next visitor immediately. Minutes passed while he stared uneasily at the closed door and fiddled with his tie. Could the man have been right? Could he have had the smallest chance of being right?

He had to admit it would be a pleasure to trip Hallam and push his face into the mud and sit on him until he choked—but it would not happen. Hallam was untouchable. Burt had had only one set-to with Hallam nearly ten years ago. He had been right, dead right, and

Hallam had been egregiously wrong and events had since proved it. Yet at the time Burt had been humiliated and had almost lost reelection as a result.

Burt shook his head in admonition to himself. He might risk reelection in a good cause, but he could not risk humiliation again. He signaled for the next visitor and his face was calm and bland as he rose to greet him.

8

BY THIS time, Lamont's theories had begun to sink into his own awareness. Earth—his whole Universe, in fact—spun on the brink of becoming Man's broken toy and nobody would listen. He was sure of his stance and it was this, far more than the desire to show up Hallam, that drove him to see Joshua Chen.

Chen was universally unpopular and anyone who dealt with him was in bad odor at once in almost every corner of the Establishment. Chen was a one-man revolutionary whose single voice could somehow always be heard because he brought to his causes an intensity that was utterly overpowering—and because he had built an organization that was more tightly knit than any ordinary political team in the world (as more than one politician was ready to swear).

Chen had been one of the important factors accounting for the speed with which the Pump had taken over the planet's energy needs. The Pump's virtues were clear and obvious, as clear as non-pollution and as obvious as a free ride—yet there might have been a longer rear-guard fight by those who wanted fission, not because it was better but because it had been the friend of their childhood.

When Chen beat his drums the world listened just a little harder. He faced Lamont, his broad cheekbones and round face bearing evidence of his approximately three-quarter admixture of Chinese ancestry and of ancient combat wisdom.

He said, "Let me get this straight. You're speaking only for yourself?"

"Yes," said Lamont tightly. "Hallam doesn't back me. In fact, Hallam says I'm mad. Do you have to have Hallam's approval before you can move?"

"I need no one's approval," said Chen with predictable arrogance, then lapsed back into thoughtful consideration. "You say the paramen are farther advanced in technology than we are?"

Lamont had gone that far in the direction of compromise. He had avoided saying they were more intelligent. *Farther advanced in technology. . .* was less offensive and just as true.

"That is clear," said Lamont. "They can send material across the

gap between the Universes and we can't."

"Then why did they start the Pump if it is dangerous? Why are they continuing it?"

Lamont was learning to compromise in more than one direction. He might have said that Chen was not the first to ask this, but the words would have sounded condescending, perhaps impatient. He chose not to say them.

"They were anxious to get started with something so apparrently desirable as a source of energy, just as we were. I have reason to think they're as disturbed about it now as I am."

"That's still your word. You have no definite evidence about their state of mind."

"None that I can present at this moment."

"Then it's not enough."

"Can we afford to risk—"

"It's not enough, Professor. There's no evidence. I haven't built my reputation by shooting down targets at random. My missiles have sped true to the mark every time because I knew what I was doing."

"But when I get the evidence—"

"Then I'll back you. If the evidence satisfies me I assure you that neither Hallam nor the Congress will be able to resist the tide. So get the evidence and come see me again."

"But by then it will be too late."

Chen shrugged. "Perhaps. Much more likely is that you will find that you are wrong and no evidence is to be had."

"I'M NOT wrong." Lamont took a deep breath and continued in a confidential tone: "Mr. Chen, there are very likely trillions upon trillions of inhabited planets in the Universe and among them there may be billions with intelligent life and highly developed technologies. The same is probably true of the para-Universe. It must be that in the history of the two Universes there have been many pairs of worlds that came into contact and began Pumping. There may be dozens or even hundreds of Pumps scattered across junction points of the two Universes."

"Pure speculation. But if so?"

"Then it may be that in dozens or hundreds of cases the mixture of natural law advanced locally to an extent sufficient to explode a planet's sun. The effect might have spread outward. The energy of a supernova added to the changing natural law may have set off explosions among neighboring stars, which in turn set off others. In time perhaps an entire core of a galaxy or of a galactic arm will explode."

"But that is only imagination, of course."

"Is it? There are hundreds of quasars in the Universe; tiny bodies the size of several solar systems but

shining with the light of a hundred full-size galaxies."

"You're telling me that the quasars are what are left of Pumping planets?"

"I'm suggesting that. In the century and a half since they were discovered astronomers have failed to account for their sources of energy. Nothing in this Universe will account for it—nothing. Doesn't it follow then—"

"What about the para-Universe? Is it full of quasars, too?"

"I wouldn't think so. Conditions are different there. Para-theory makes it seem quite definite that fusion takes place much more easily over there, so their stars must be considerably smaller than ours on the average. There it would take a much smaller supply of easily fusing hydrogen to produce the energy our sun does—a supply as large as that of our sun would explode spontaneously. If our laws permeate the para-Universe their hydrogen will become a little more difficult to fuse—the para-stars begin to cool down."

"Well, that's not so bad," said Chen. "The para-men can use Pumping to supply themselves with the necessary energy. By your speculations they're in fine shape."

"Not really," said Lamont. "Once our end explodes the Pumping stops. They can't keep it up without us and that means they'll face a cooling star without Pump energy. They might be worse off than we—we'd go out in a painless flash while their agony would be long drawn out."

"You have a good imagination, Professor," said Chen, "but I'm not buying it. I don't see any chance of our giving up Pumping on nothing more than your imagination. Do you know what the Pump means to mankind? It's not just the free, clean and copious energy. Look beyond that. What it means is that man no longer has to work for a living. It means that for the first time in history, mankind can turn its collective brain to the more important problem of developing its true potential. For instance—not all the medical advances of two and a half centuries have succeeded in advancing man's full life-span much past a hundred years. We've been told by gerontologists over and over that there is nothing, in theory, to stand in the way of human immortality, but so far not enough attention has been concentrated on this."

Lamont said angrily, "Immortality? You're talking of pipe-dreams."

"Perhaps you're a judge of pipe-dreams, Professor," said Chen. "But I intend to see that research into immortality begins. It won't begin if Pumping ends. Then we are back to expensive energy, scarce energy, dirty energy. Earth's two billions will have to go back to work for a living and the pipe-

dream of immortality will remain a pipe-dream."

"It will anyway. No one is going to be immortal. No one is even going to live out a normal lifetime."

"Ah, but that is only your theory."

Lamont weighed the possibilities and decided to gamble. "Mr. Chen, a while ago I said I was not willing to explain my knowledge of the state of mind of the para-men. Well, let me try. We have been receiving messages."

"Yes, but can you interpret them?"

"We received an English word."

Chen frowned. He suddenly put his hands in his pockets, stretched his short legs before him and leaned back in his chair.

"And what was the word?"

"Fear." Lamont did not feel it necessary to mention the misspelling.

"Fear?" repeated Chen. "And what do you think it means?"

"Isn't it clear that they're afraid of the Pumping phenomenon?"

"Not at all. If they were afraid they would stop it. I think they're afraid, all right, but they're afraid that our side will stop. You've gotten across your intention to them and if we stop it, as you want us to do, they've got to stop also. You said yourself they can't continue without us—it's a two-ended proposition. I don't blame them for being afraid."

Lamont sat silent.

"I see," said Chen, "that you haven't thought of that. Well, then, we'll push for immortality. I think that will be the more popular cause."

"Oh, popular causes," said Lamont, slowly. "I didn't understand what you found important. How old are you, Mr. Chen?"

Chen blinked, then turned away. He left the room, walking rapidly, his hands clenched.

Lamont looked up his biography later. Chen was sixty and his father had died at sixty-two. But it didn't matter.

9

"YOU don't look as though you had any luck at all," said Bronowski.

Lamont was sitting in his laboratory, staring at the toes of his shoes and noting idly that they seemed unusually scuffed. He shook his head.

"No."

"Even the great Chen failed you."

"He would do nothing. He wants evidence, too. They all want evidence, but anything I offer them is rejected. What they really want is their damned Pump, or their reputation, or their place in history. Chen wants immortality.

"What do you want, Pete?" asked Bronowski softly.

"Mankind's safety," said Lamont. He looked at the other's quizzical eyes. "You don't believe me."

"Oh, I believe you. But what do you really want?"

"Well, then, by God—" Lamont brought his hand down flat on the desk before him in a loud slap—"I want to be *right*—and I *am* right."

"You're sure?"

"I am sure. And there's nothing I am worried about, because I intend to win. You know—when I left Chen I came near to despising myself."

"You?"

"Yes, I. Why not? I thought— At every turn Hallam stops me. As long as Hallam refutes me everyone has an excuse not to believe me. While Hallam stands like a rock against me, I must fail. Why didn't I work through him? Why didn't I butter him up, indeed? Why didn't I maneuver him into supporting me instead of needling him into fighting me?"

"Do you think you could have?"

"No. As you imply, nothing could have turned him against the Pump. Of course, when I first turned him against me, there was as yet no question of Earth's doom, but I took care to make my relationship with him worse when that question arose. In my despair I thought—well, all sorts of things. I even thought of emigrating to the moon colony if they'd accept my type of ability among their scientists. I wasn't sure they would."

"But you don't seem to despise yourself now."

"No. Because my conversation with Chen brought a dividend. It showed me I was wasting time."

"So it would seem."

"Yes, but needlessly. It is not here on Earth that the solution lies. I told Chen that our sun might blow up but the para-sun would not, yet that would not save the para-men, for when our sun blew and our end of the Pump halted, so would theirs. They cannot continue without us, do you see?"

"Yes, of course I see."

"Then why don't we think of the reverse? We can't continue without them. In which case, who cares whether we stop the Pump or not? Let's get the para-men to stop."

"Ah, but will they?"

"They said F-E-E-R. And it means they're afraid. Chen said they feared that we would stop the Pump—but I don't believe that for a moment. They are simply afraid as you and I are. I sat silent when Chen made his suggestion. He thought he had me. He was quite wrong. I was only thinking at that moment that we had to get the para-men to stop. And we've got to. Mike, I abandon everything except you. You're the hope of the world. Get through to them somehow."

Bronowski laughed and there was almost a childlike glee in the sound.

"Pete," he said, "you're a genius."

"Aha. You've noticed."

"No, I mean it. You guess what I want to say before I can say it. I've been sending message after message, using their symbols in a way that I guessed might signify the Pump and using our word as well. And I did my best to gather what information I've scrabbled together over many months to use their symbols in a way signifying disapproval and using an English word again. I had no idea whether I was getting through or was a mile off base and—from the fact that I never got an answer—I had little hope."

"You didn't tell me what you were trying to do."

"Well, this part of the problem is my baby. You take your sweet time explaining para-theory to me."

"So what happened?"

"So yesterday I sent off exactly two words—our language. I scrawled: P-U-M-P B-A-D."

"And?"

"And this morning I picked up a return message at last. It's simple enough and straightforward, too. It goes: Y-E-S P-U-M-P B-A-D B-A-D B-A-D. Here, look at it."

LAMONT'S hand trembled as it held the foil. "There's no mistaking that, is there? That's confirmation, isn't it?"

"It seems so to me. Whom will you take this to?"

"To no one," said Lamont decisively. "I argue no more. They will tell me I faked the message and there's no point in my sitting still for that. Let the para-men stop the Pump and it will stop on our side, too, and nothing we can do unilaterally will start it up again. The entire Station will then be on fire to prove that I was right and that the Pump is dangerous."

"How do you figure that? Because it will be the only way they can keep themselves from being torn apart by a mob demanding the Pump and infuriated at not getting it?"

"Well, maybe. But one thing bothers me."

"What's that?"

"If the para-men are so convinced that the Pump is dangerous, why haven't they stopped it already? I took occasion to check a while ago and the Pump is working swimmingly." Lamont frowned. "Perhaps they don't want a unilateral stoppage. They may consider us their partners and want a mutual agreement to stop. Don't you suppose that might be so?"

"It might be. But it might also be that communication is less than perfect—that they don't yet quite understand the significance of the word B-A-D. From what I said to them via their symbols, which I may well have twisted utterly, they may think that B-A-D means what we consider G-O-O-D."

"Oh, no."

"Well, that's your hope, but there's no payoff on hopes."

"Mike, just keep on sending messages. Use as many of the words they use as possible and keep ringing the changes. You're the expert and it's in your hands. Eventually they'll know enough words to say something clearly and unmistakably and then we'll explain that we're willing to have the Pump stopped."

"We lack the authority to make any such statement."

"Yes, but they won't know, and in the end we'll be mankind's heroes."

"Even if they execute us first?"

"Even so. It's in your hands, Mike; and I'm sure it won't take much longer."

10

AND yet it did. Two weeks passed without another message and the strain grew worse.

Bronowski showed it. His earlier lightness of heart had dissipated and he entered Lamont's laboratory in glum silence.

They stared at each other and finally Bronowski said, "It's all over the place that you've received your show-cause."

Lamont had not shaved that morning. His laboratory had a forlorn look about it, a not-quite-definable packing-up look. He shrugged. "So what? It doesn't bother me. What does bother me is that *Physical Reviews* rejected my paper."

"You said you were expecting them to."

"Yes, but I thought they might give me reasons. They might have pointed out what they thought were fallacies, errors, unwarranted assumptions. Something I could argue about."

"And they didn't?"

"Not a word. Their referees did not consider the paper suitable for publication. Quote, unquote. They just won't touch it. It's really disheartening—the universal stupidity. I think that I wouldn't grieve at mankind's suicide through sheer evilness of heart or through mere recklessness. There's something so damned undignified at going to destruction through simple thick-headed stupidity. What's the use of being men if that's how you have to die?"

"Stupidity," muttered Bronowski.

"What else do you call it? And they want me to show cause why I ought not to be fired for the great crime of being right."

"Everyone seems to know that you consulted Chen."

"Yes." Lamont put his fingers to the bridge of his nose and wearily rubbed it. "I apparently got him annoyed enough to go to Hallam with tales and now the accusation is that I have been trying to sabotage the Pump project by unwar-

ranted and unsupported fright tactics in an unprofessional manner and that this makes me unsuitable for employment on the Station."

"They can prove that easily, Pete."

"I suppose they can. It doesn't matter."

"What are you going to do?"

"Nothing," said Lamont indignantly. "Let them do their worst. I'll rely on red tape. Every step of this thing will take weeks, months—and meanwhile you keep working. We'll hear from the para-men yet."

Bronowski looked miserable. "Pete, suppose we don't. Maybe it's time for you to think about this again."

Lamont looked up sharply. "What are you talking about?"

"Tell them you're wrong. Do penance. Beat your breast. Give up."

"Never! By God, Mike, we're playing a game in which the stakes are all the world and every living creature on it."

"Yes, but what's that to you? You're not married. You have no children. I know your father is dead. You never mention your mother or any siblings. I doubt there is a human being to whom you are emotionally attached as an individual. So go your way and the hell with all this."

"And you?"

"I'll do the same. I'm divorced and I have no children. I have a young lady with whom I'm close and that relationship will continue while it can. Live! Enjoy!"

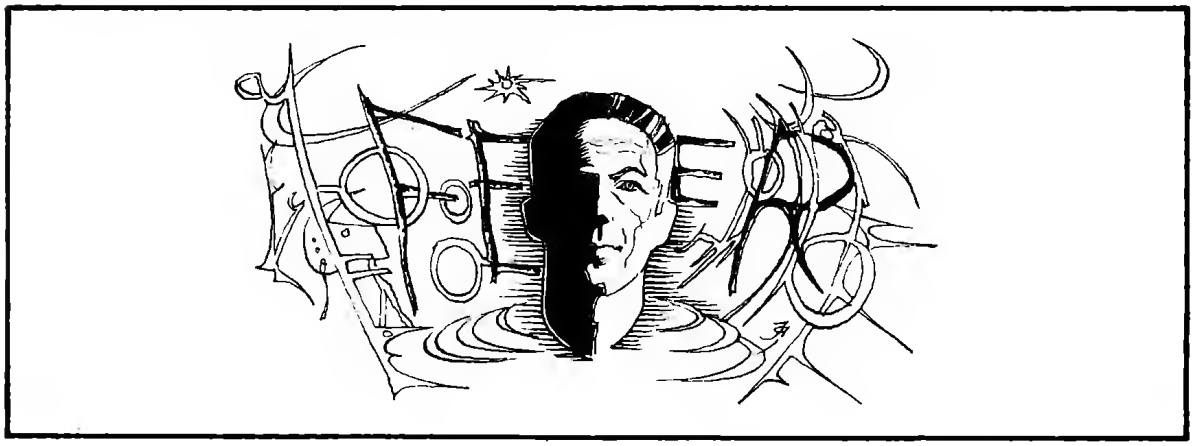
"And tomorrow?"

"Will take care of itself. Death when it comes will be quick."

"I can't live with that philosophy. Mike. *Mike!* What is all this? Are you trying to tell me that we're not going to get through? Are you giving up on the para-men?"

Bronowski looked away. He said, "Pete, I did get an answer. Last night. I thought I'd wait for today and think about it, but why think? Here it is."

Lamont's eyes were staring questions. He took the foil and looked at it. There was no punctuation:



PUMP NOT STOP NOT STOP WE NOT STOP PUMP WE NOT HEAR DANGER NOT HEAR NOT HEAR YOU STOP PLEASE STOP YOU STOP SO WE STOP PLEASE YOU STOP DANGER DANGER DANGER STOP STOP YOU STOP PUMP

"By God," muttered Bronowski. "They sound desperate."

Lamont was still staring.

Bronowski said, "I gather that somewhere on the other side is someone like you—a para-Lamont. And he can't get his para-Hallams to stop either. And while we're begging them to save us, he's begging us to save them."

Lamont said, "But if we show this—"

"They'll say you're lying—that it's a hoax you've concocted to save your psychotically conceived nightmare."

"They can say that of me, maybe, but they can't say it of you. You'll back me, Mike. You'll testify that you received this and how."

Bronowski reddened. "What good would that do? They'd say that somewhere in the para-Universe there is a nut like yourself and that two crackpots got together. They'd say that the message proves that the constituted authorities in the para-Universe are convinced there's no danger."

"Mike, fight this through with me."

"There's no use, Pete. You said it yourself—stupidity. Those paramen may be more advanced than we are—but it's plain to see that they're just as stupid as we are and that ends it. Schiller pointed that out and I believe him."

"Who?"

"Schiller. A German dramatist of three centuries ago. In a play about Joan of Arc, he wrote: 'Against stupidity, the gods themselves contend in vain.' I'm no god and I'll contend no longer. Let it go, Pete, and go your way. Maybe the world will last our time and if not—there's nothing that can be done anyway. I'm sorry, Pete. You fought the good fight, but you lost. And I'm through."

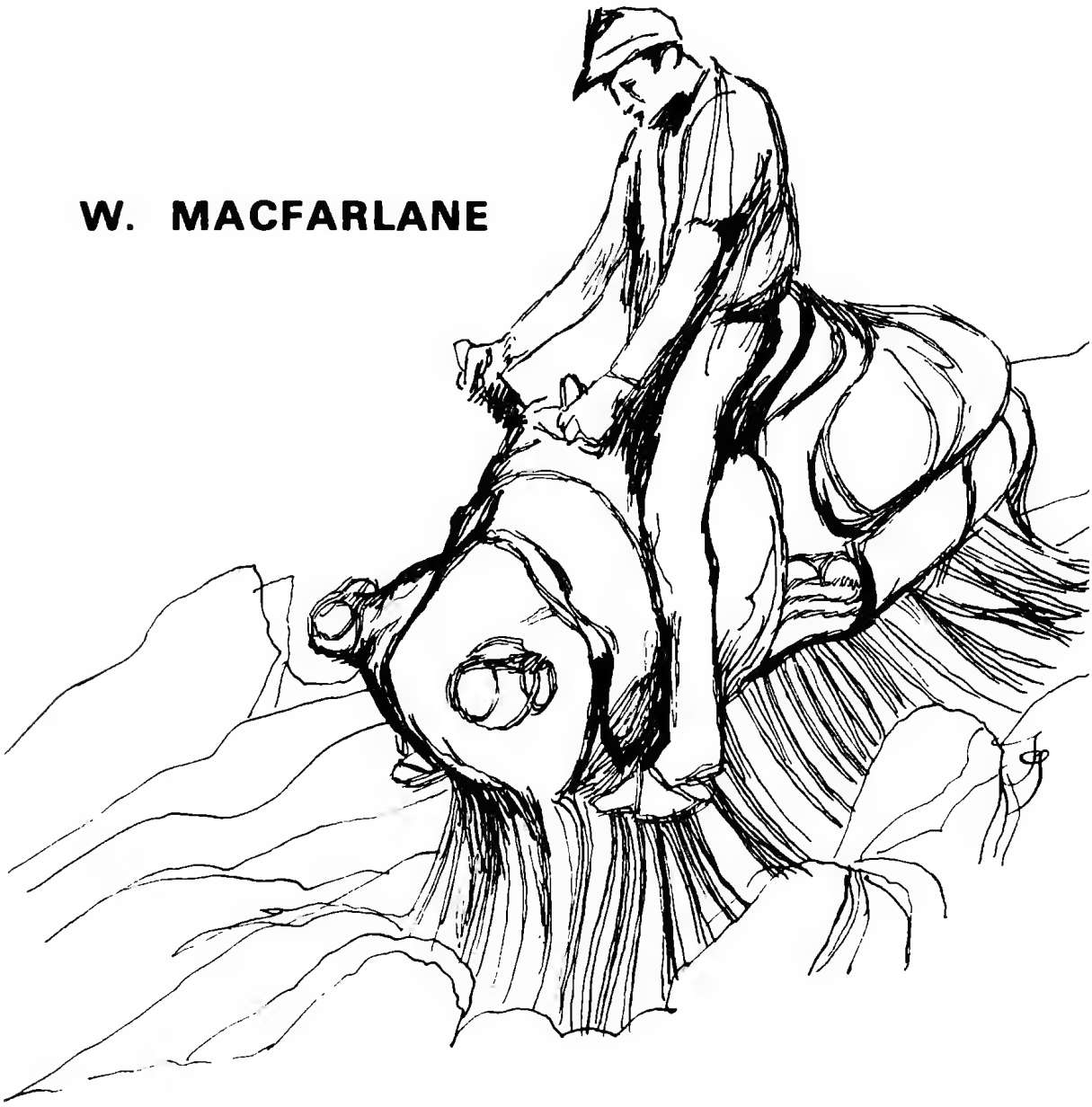
He was gone and Lamont was alone. He sat in his chair, fingers aimlessly drumming, drumming. Somewhere in the sun protons were clinging together with a trifling additional avidity and with each moment that avidity grew—and at some moment the delicate balance would break down.

"And no one on Earth will live to know I was right," cried out Lamont, and blinked to keep back the tears.

TO BE CONTINUED

(The second installment of The Gods Themselves *will appear in March-April 1F, on sale February 28. The third and final installment will appear in May-June GALAXY, on sale March 28. See Editor's Page, this issue, page 4.)*

220—ADVANCED FIELD EXPLORATION



W. MACFARLANE

Only killing will get rid of some people. Others you can pay to stay away!

GENERAL CATALOGUE
COLLEGE STATION

Geophysics

220—Advanced Field Exploration

Mr. Rohnagan and Staff

Prerequisite, knowledge of principles of pragmatic mineralogy, prior field experience and consent of instructor.

Lectures and extended field exercise on the application of psychology to prospecting. Planning, design and execution of exercise, exploration techniques, application of methods to mineral exploration and mining, stressing integrated use of psychologic guides in the search of mineral deposits.

Fee: $4000 full participation less pro rata expenses, credit lien add 10% plus standard interest, OR assignment of income over $4000 less 25% retention.

Classification HAZARDOUS. Hold-harmless agreement, minimum insurance package, 2A level inoculation, conditioning REQUIRED. Time: 180 standard days. Enrollment limited.

TOM ROHNAGAN landed at Critchlow on Edris. He looked at the booming surf, the wind-blown palms and the tawny beach. He rubbed his week-old beard and pushed his hat back on his head. His skin prickled with sweat in the coastal humidity. He stood in the shade of the Interface ship and waited while the ramp slid out and the cargomaster drove the battered prime mover and new trailer onto the concrete.

Rohnagan hitched his pants and spat. He signed the delivery ticket and drove the rig to the Entry Port. He unlocked the trailer and opened all compartments for fumigation. Next door in the Doc's office he heard the gates clunk together and seal, the pumps drop the pressure to half atmospheric and the decontaminant *whoosh* into the chamber. He stripped and walked into the medical machine.

It had a sickly bedside manner. "We've been overworking, haven't we? Neglecting our health in the stress of affairs? Not enough exercise for the best muscle tonus, and the liver a little sluggish. A sound mind in a sound body—"

"Go to hell, Doc," said Rohnagan.

"—tranquilizers are indicated and will be made available at cost by Bahia General Services. Please deposit the medical fee. For consultational reference while on Edris, call 71-4765-0842. Have a nice day." Critchlow was the oldest of the Bahia vacation cities but that was no excuse for a smarmy medical machine.

Rohnagan swore and waited out-

side while the fumigant decomposed. The bay opened and he drove through the service and warehouse blocks of Critchlow, around the cliff with waves breaking on the rocks, to the city itself. The administration offices were well back from the beach. He parked beside a row of flambeau trees in full bloom. He walked slowly to the building. His footsteps set up an echo in time. He had not seen flambeaus for twenty years. He stopped in the shade and the echo steps stopped. He looked around but he was alone. The ghost of young Tom Rohnagan was standing beside him. So this was a joint venture, his own weight of experience coupled with young Tom's observations of so long ago.

THE clerk of mines was a lean old woman who could talk and type simultaneously. "A five-year lease and a five-year prospecting ticket, all righty. The maximum in both cases. You spell your name—ah-ha. Thumbprint here. You understand the mineral laws of Edris, hmm? I ask you pointedly because there is no rescue and no hard feelings, in acceptance of the Law of Limitation and the Fool's Act. Sign here. Where is Bluewater, Mr. Rohnagan?"

"Twelve hundred kilometers in."

"That awful desert and the pammas, hmm? All those little eyes looking at you. A zoologist from College Station tried to eat one. He said it tasted like an owl boiled whole—special permit you understand—highest indigenous life—ecologically valuable—auburn hair, hazel eyes, male—they eat bugs—sign here."

"What's the export duty these days?"

"Ten dollars a hundred assessed valuation. It used to be twenty, but policy is to encourage development. Imagine a mineral-rich planet where the biggest money value is sand and gravel. Nobody wants to stay in the desert." She cocked her head. "Don't buy any expensive gear, Mr. Rohnagan, milling machines or ball mills or classifiers. We have an abandonment ordinance and I can rent you whatever you will need. A man wakes up one morning and asks himself what am I doing here, hmm? Usually he leaves before breakfast, and before he eats he checks the Interface schedule. Then he's another Long Gone John with the pammas sitting around watching his equipment get covered over with sand."

Rohnagan said he liked the peace and quiet, thanked her and left. He took a cab to a bar called the Tap Easy. The bartender was an ex-prospector named Bellici, who told him that Jerry Korsmo had a

nice little lead-galena strike before he hauled off, that Mercer Seldomridge filed on copper but never proved up and that Lance Cozensa got some kunzite before he peeled out. "They come and mostly go," said Bellici. "There was a funny pair a week ago, two-meter Swinney and his partner Gronewald, thirty centimeters shorter and they weighed the same. You wouldn't believe. Oh, I brought out a sunburn myself once and a thirst that hasn't quit yet. All that empty! All them eyes!"

"Uh-huh," said Rohnagan. He finished his ceremonial drink and went back to the prime mover. He drove to the service area and gave his list to a supplier. The man put it into the proper code and, while they waited, told Rohnagan about Nan McAnn who had ordered the same things. The man figured it was a boom between busts in the mining cycle. He read a printout and said there had been six in the last two weeks—the McAnn woman, Poulin, Clark, Yanabu, Swinney and Gronewald—all out for riches. He laughed. "Tap easy, she's deep enough, yuk-yuk. I seen that desert. You can have my share."

Rohnagan put the packages into the trailer and drove to the nearest offtake pad, inland and uphill from the service area. He got out to stretch and look at the sunset. Here was the end and the beginning of his irresolution.

He was not timid, irresponsible or unable to make up his mind. If a course of action was clear before him, he acted with vigor. He abominated principle as a movable brick wall and yet he worked from first principles. His irresolution was based on a fundamental human peculiarity—he wanted to be a good man, but what is good?

He was not afraid of the desert. He approved of the Law of Limitation. Any authority must limit itself or become an all-devouring monster. Go into the desert if you like, but save your breath to cool your porridge if you get into trouble. The Bahia cities endorsed the Fool's Act as a philosophic base—you are free to kick a bear in the nose—and the price of freedom is personal responsibility. But what is good?

The design and execution were good. The staff and class were arriving from a dozen planets. The conditioning was holding. He was comfortable in his role of prospector and was reasonably certain this would be a spectacular operation from a monetary viewpoint. Good enough. But. . .

Was his meddling justifiable?

On what scale of values? From what viewpoint? At what price?

How congruent was intelligence?

Right, wrong or standing on his head, he was here. He spat. The point of no return had passed when he was born. He pulled down his hat, climbed into the prime mover and lifted into the air. He drove over the Coast range and set the guidance. He slept the night away over the howling wilderness.

BLUEWATER was in a saddle of the Great Spineys, tucked between the paws of two hills. The water from the spring ran nearly a quarter kilometer before it was sucked into the air and down into the sand. The brush ran from green-gray to gray-white along the course of the stream. A few trees with lacy leaves and pink trunks stood around. A serpentine humped to one side, an intertwined mass of bright green withes with vivid coral blossoms.

A pamma watched him land. He multigraved the trailer to check the gear. He left the sensors on. If a wind should rise, all points would keep in constant weight relationship with the planet. Six pammas sat in a row on a boulder—a pair each of diggers, flyers and lopers. He ignored their flat gray eyes and hauled the hosehead to the spring. The telltale stuttered amber and settled to green. The water was not blue, but it was potable.

A happy-go-lucky bug bumbled around his head and flew away. The nearest pamma spat a sticky globule. The happy-go-lucky whirred with tacky wings—the pamma ran out a telescoping arm to catch it in the air and pop it into his mouth. A pamma is shaped like an avocado. It has a constrictor mechanism in the sloping shoulders. It hunched and shrugged and continued to watch the man.

He opened the stable door and brought out one of his two burros. It was a heavy-duty model that had all the options. He pushed the hee-haw button to give the pammas a treat. They took no notice. They sat in a row and blinked their button eyes out of synchronization. They always kept one eye open. When the wind carried sand, their eyes were puce with the nictitating membrane instead of gray.

"Peace and quiet," said Rohanagan.

He climbed onto the burro and rode slowly to the top of the hill behind Bluewater. With the sun just over the horizon, the ridges and valleys and plains were defined by long shadows. The Great Spineys ran northeast-southwest, crest on blue crest, unnamed peaks rosy in the dawn glow. He felt himself relax from the tensions of civilization. He crossed his legs tailor fashion on the saddle and watched the

landscape slowly meld as the sun rose. He turned the burro downhill on the homing circuit and was pleased with the way it chose a path over and around the rocky slope on its 424 wire legs. Pammas watched.

He ignored them.

"The bliss of solitude," he said and believed it as he shut the stable door and went inside to unpack.

He was perfectly happy for two weeks. He found wheat gold in a box canyon and dry-milled enough in five days to cast a standard ten-kilo bar. Off to the west he identified an outcrop of WO_3 in case somebody needed tungsten. He crossed a saline-white dry lake to a relatively old range of hills and noted a natural cave.

He did not quite believe it geologically, but he crawled underground to a small cavern. It was bright red by torchlight and the floor sloped to a puddle of liquid mercury. He scooped up a handful of the heavy metal and poured it back. A pamma watched from the cave entrance and flippity-flopped ahead of him when he walked out. He studied the rock wall, drilled a pattern with a laser bit, loaded the holes with filgrinite twenty, fused them with his personal key-coded fuse and tried to shoo away the pammas. They sat above the cave and stared at him.

Pammas are not lovable creatures. As insectivores they serve a purpose, but their fur breaks off in barbels and they have as interesting personalities as china doorknobs. Still and all, Rohnagan rode the burro along the hill and waited while the pammas re-assembled themselves before he blew the cave down.

"That was a narrow escape," he told them. "The love of money is the root of all evil, gang. Free mercury is too valuable. I came here to get away from it all. You can't imagine the temptations outside. I know your sex life is more complicated than mine because you get three kinds in one litter, but I bet you never looked into a pool of mercury and saw a good-looking girl batting her eyes at you in sync. Dollar signs in them. Temptation of the devil, gang."

He pulled the triptape out of the burro and carefully cut away a section. "This won't show on my map. Get a lot of people in here. Got to be careful, right?"

A couple of flying pammas swooped through a cloud of gnats with their mottled gray-and-green mouths open, wind whistling through their strainers. They plopped down beside the others and shrugged their shoulders.

Rohnagan drank a cup of cold tea from the burro's reservoir and set off for Bluewater. He walked

with an easy gait but when he found himself paying no attention to the formations, he mounted the burro and pushed the Home-James button.

"I think the Doc was right," he told a pamma sticking its head out of a burrow. "I need an application of tranquilizer."

The pamma blinked one eye.

TWO men were soaking in a little pool below the spring. They were the long and short of it, Alf Spinney and Gurchie Gronewald. They had run out of food and water and were lost besides. Rohnagan said he had just escaped a fate worse than death and why hadn't they got into the trailer and fed themselves? Alf was the tall one. He was shy. He sat in the water and sank so deep only his eyes and the tips of his red ears showed. Gurchie said they were honest men and couldn't break into somebody's trailer like that—besides they had just arrived.

"I got the distiller going with red corn when I set up here," said Rohnagan, "and it's a violation of the Fool's Act not to have a drink."

They suffered when they drank his whiskey. Their salivary glands squirted and their stomach juices sloshed. He reconstituted a couple of protinella patties and heated them in frozen buns. They vanished like snowballs thrown at pammas at high noon.

He gave his guests another drink.

"What are you boys looking for?"

"Sun and bugs and sand and pammas, I guess," said Gurchie.

"So far we found experience," said Alf.

"And the crazy pammas watching."

"Sure a lot of nothing here."

Their eyes wandered and returned to the radar range. This time Rohnagan fed them a dozen little fish with a lively sauce on toast strips. The youngsters said they were broke but they hoped to pick up hand-loading jobs at the Bahia cities. All they had done so far was wear the legs down on their burros —but they would get back to prospecting when they were able.

"I'll grubstake you," said Rohnagan. He explained the term did not mean conveyance of property or a lien against future income. Alf said it was sure uncomfortable to ride with his feet on the burro's neck to keep them from dragging. Rohnagan said you walk when you prospect and Alf showed him shoes with the soles worn out.

"What's to keep us from stealing this grubstake?" said Gurchie.

"Not a thing. I gamble on a cut of your next trip. I'll run you over to Critchlow because I want a change anyway."

"We could off-planet with your money."

"Sure enough."

"Where do you want our thumbprints?" said Alf.

"On your thumbs. What we do is shake hands and have a drink and then it'll be supper time."

The next day they flew to Critchlow. He told them the block of gold was about 920 fine with copper and silver and he bought them a drink at the Tap Easy while he listened to their protests.

"You might be lucky next time," he said. "Get the best equipment and the best supplies."

They decided to try an area away from Bluewater, so Rohnagan left them, went to a restaurant to avoid his own cooking, had a few drinks and slept on guidance back to the trailer.

"Good to be here. Things haven't changed much. Far from the madding crowd," he said to the pammas. He puttered happily around the trailer and even lined out some rocks to indicate a path to the spring. "If I had white paint, I'd paint them white," he said.

A MAN named Rulon Clark dropped in the next day. He was very nice about it and asked if Rohnagan minded if he located there for a while. He played a good game of cribbage and made a superior sort of beer. He was a desirable neighbor, Rohnagan supposed. Poulin pulled in and then Hartis, who only wanted water before he went off again. Nan McAnn arrived in a tired camper and made a fourth for bridge. Rohnagan was alarmed by the condition of her equipment and spent three days putting it into less perilous shape. She was a bossy, comfortable woman who liked cooking and had the devil's own luck at cards. Colvin and Trayloren sat two nights for poker and moved on. Mary Mayerling and Pierre Sutton and Ellaree Hill used Bluewater as a base. Rohnagan woke one morning and said the hell with it.

He packed one burro and rode the other for two days before he began walking. He knew about seismic, gravimetric, magnetic, electrical and radioactive prospecting, but he believed a real understanding of minerals came through the soles of the feet.

"What's the use of being a *fast* prospector?" he asked the pammas. "All those people," he grumbled. "How can you prospect in a herd?" He got no answer. "Sure, it's nice to see somebody once in a while, but the social whirl is getting too damn thick."

He was working through broken country when he found tourmaline. He thought they were tourmaline

crystals, pink and green. He passed them by, but he could not ignore a lenticular stone he found a few days later. It was adamantine. Filaments of grape purple shifted in a pale transparency as he turned it in his hand. He trembled and there was a ragged streak of yellow, intense pale lightning in the stone. He put it in a corner of his burro and found seven more similar stones before he came to his senses.

"Never heard of such a thing," he marveled. "Storm jewels! This is terrible!" The pammas blinked.

He returned to Bluewater in a roundabout fashion to face another disaster. Alf and Gurchie had been there the day before and left a dozen oweins as his share of their grubstake expedition. The rough oweins were orange rocks. Faceted, they were orange fire.

"Oh, hell," he said to Nan McAnn. "This is ridiculous. The littlest is worth ten bars of gold. I hate honest men!"

"They said their luck changed because of your grubstake. They made me give them some more of your supplies. Do you mind if I set up a store—I could get a lot of stuff with one owein."

"Whatever you want. You keep the things. Don't bother me."

"A lot of people are prospecting now. Will it be all right if I grubstake them a little?"

"Oh, peace," he said. "Oh, solitude! I'm taking off. I won't be back until all these people fall off cliffs or fry their brains or thirst to death. Have they repealed the Fool's Act? I never set out to be a founding father. I'm no real estate promoter—I never asked—"

"The boys brought you a sack of red corn, too," she said soothingly. "I ran some through your hurry-up distiller."

"Terrible, terrible, terrible," he grumbled, but he went to the trailer and soothed himself for a week.

THE arrival of the foundation sobered him up. It was thirty-by-thirty meters. Nan said she got it at a bargain in Critchlow. It was the very first apartment moved into town, but tastes change and the new apartments came from Brummigen in a modern decor and with the traveling base and support systems integral. The owners had a demolition party and tore up the insides, so she spent a little fuel and dumped the ravaged rooms toward the sun.

"Did you spend the oweins?" His face fell when she said there were three of the largest left. "I don't want money," he grumbled. "Get rid of them."

He serviced his burros and fled Bluewater.

He wandered into the Plains of Doom, a fancifully named area intricately undercut with caverns. The gossip was that the plains claimed the lives of four out of ten prospectors who ventured onto them. What saved Rohnagan's life were the inertial antigravity units built into the burros. Choosing a route with a lifetime of geological skill, he still found the treacherous footing collapsing under him time and again. The burros dropped free for fifty centimeters and nulled gravity in another fifty.

"Sure-footed little beasts," Rohnagan told the pammas.

He followed one series of caves for kilometers and spent two nights underground. He found the first blush pearl and all his rationality vanished. The pearl was a spheroid as large as his thumbnail with a pale pink infusion. He held it in the palm of his hand and fell into it dreaming—until he fortunately fell on the hee-haw button. The pink world had grown deeper as he stared, demanding total involvement. It was changing into crimson when the burro brayed.

Rohnagan filled a compartment of the pack burro before he groaned and said to a pamma, "Just like glass marbles, that's all," and returned to the surface of the plain. He was reasonably certain there was no such thing as a hypnotic mineral, but he studied the pearls no more in depth.

At Bluewater again, he found thirty-eight men and women camped around the spring. The apartment foundation had ten-meter modular units stacked three high. The ground floor was taken up by Nan's combination bar-and-grill and store along with a minerals-processing laboratory. The second and third tiers held ores and refined metals in storage for their owners.

Nan McAnn was apologetic. "Everybody wanted to be grubstaked. It seems you're lucky. Anybody with you as a silent partner finds all manner of things. I'm sorry."

"I won't put up with it," he said. "Get all those people together. I'll talk with them tonight."

He would not listen to her protests and rode a burro up the hill behind Bluewater. He grumbled over the crest and along a ridge to a plateau jumbled with boulders. He sat in the shade.

"I got a lease on Bluewater. Too many people now and what next?" He frowned at the pammas, some in the shadows and others in the sun. "How can I tell?" he asked them. "What's the proper thing to do? I can't tell good, dammit, from an FLR. That's technical jargon, gang. I don't know good from a

Funny Looking Rock. Every honest geologist uses the term."

THE gray shoebutton eyes of the pammas met his own. He was accustomed to this, but he was surprised when they fixed their beady glance on a rock beside his foot. He picked it up. The eyes returned to his face. It was an ordinary FLR, gray and speckled. He tilted it and the light caught two white circles, very thin, in the rock.

"Uh-oh," said Rohnagan.

He pulled out his magnifying glass. The two perfect circles just barely intersected. "Like a forty-meter crochet hoop with another overlaid by about twenty centimeters? Maybe the spindle section is our congruency," he said slowly. "And the lunes would indicate the comparative area of our divergent interest."

They were ordinary pammas, no different from the thousands he had seen. A digger pushed up through the sand and shrugged its shoulders. Rohnagan looked at the beast and sighed. Dolphins at least grinned and made noises and didn't line up to stare at you. It was sad and funny that alien intelligence should be—alien.

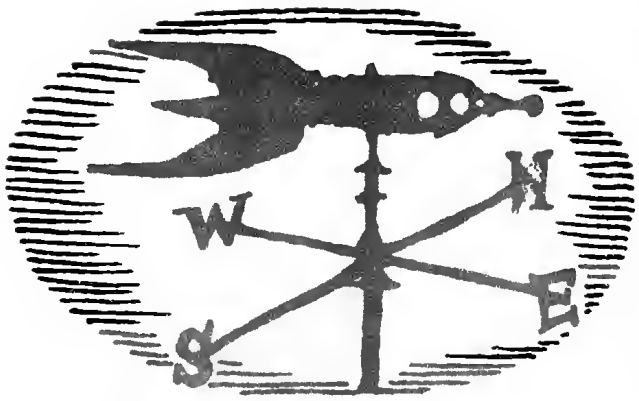
"Well gang, you probably don't remember that I came here as a young man—or do you have a common memory? And I found oweins, the first ever discovered, so you bought me off then. One thing led to another and I couldn't get back until now. And it's only because you've paid and overpaid me to go away that I'm reasonably certain of the hunch I had then. I get this feeling that with mutual best wishes, you look at things one way and we have other considerations."

Three lopers flopped onto a rock. A flyer thumped down in the graceless way of pammas.

"And maybe that spindle section is empathic," Rohnagan mused. "Some you buy and others deny—to get us out of your habitat. Our curiosity has no more moral merit than whatever your own preoccupations may be. I have no idea how you make jewels—molecular manipulation? I do know that every ore body out of the coastal humidity belt amounts to a pocket deposit, just enough to be discouraging."

He leaned back against the rock and took off his hat. "You've worried me for twenty years. There's a creature on earth whose only defense is fecundity. It survives nicely where tigers could not without help from man. But guinea pigs never tried to buy anybody off—if they did, I don't know about it. Your reward syndrome won't work too well with a greedy man—wait, I understand—you give him nothing.

(Please turn to page 175)



DIRECTIONS

Does science fiction have a purpose different from that of "mainstream" fiction? It's a point I've been pondering lately in light of the recent onslaught of near-mainstream sf novels and stories. They range all the way from Disch's The Asian Shore *and Russ's* View From This Window *to D. G. Compton's novel,* Chronocules, *and GALAXY's own Hugo and Nebula Award winning story,* Slow Sculpture, *by Theodore Sturgeon. None of these works is poorly written—in fact, all of them are above average in literary quality. What I'm wondering about is—do they fully exploit their science-fiction potential?*

Reading them, you may find—as I did—that the actual science-fiction elements in them are incidental. Chronocules, *for example, is about a time-machine project, supposedly, but the relationship that develops between the two main characters could have just as easily occurred in a mainstream piece. The time machine has nothing to do with it and affects them not at all—it is merely an incidental bit of background material and the secret project they work on could be a WW II atomic bomb project without essential alterations in the story.*

I feel that a good piece of science fiction should not only come up to proper literary standards in terms of plot development, characterization, style, etc.—it should also have a root involvement with its science fiction theme. The genre requirement should not be thrown in merely as incidental decoration.

That technique of forcing an out-of-genre story into the science-fiction category used to be what was wrong with the space-opera epics of the old sf pulp magazines, with their shoot-'em-up-cowboy stories transplanted to other planets. And the same is basically what is wrong with the stories I've listed above, despite the fact that they're much better written. Their sf content has nothing to do with the effect the author set out to achieve. I feel they're borderline stories and hard to classify.

Does it matter, someone might ask, if science-fiction writers try to achieve mainstream effects in their work? But if it doesn't we're confronted with the question: what's the point of science fiction if it doesn't do something different from general fiction?

What would be the point of a rock song that was indistinguishable from a symphony? It might be good music—but would it be good rock music?

Cy Chauvin
Roseville, Michigan

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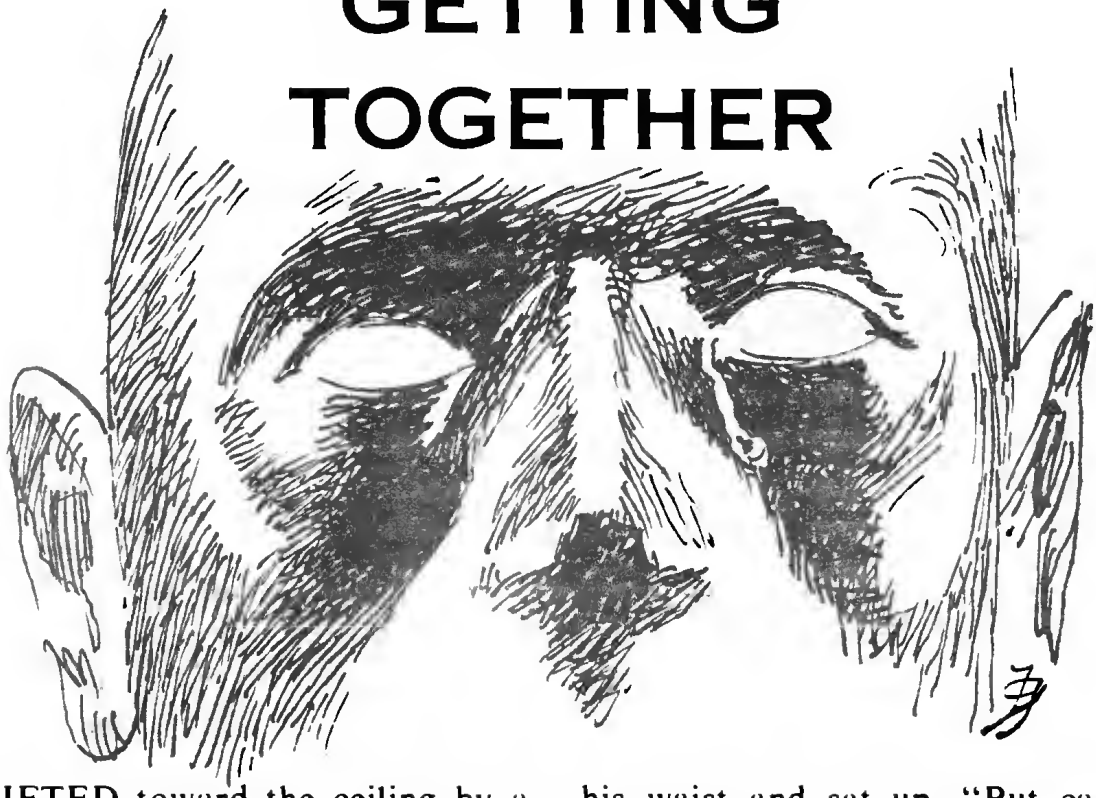
Galaxy will pay $10 for a lead letter and $5 each for other letters published in *Directions.* Address correspondence intended for this department to: *Directions,* Galaxy Magazine, 235 E. 45th Street, New York, N.Y. 10017.

Onestone's inhuman problem needed a human solution. . .

MILTON A. ROTHMAN

GETTING TOGETHER



LIFTED toward the ceiling by a score of hands, Onestone felt as though he were standing on his head prior to rocketing toward outer space. When they gently laid him on the floor he felt sorry that the experience was over.

"Oh, wow," he finally said. Then he lay still for a while.

"You see," Jay Foreman said gently. "We can be trusted. We could bear your weight and we didn't drop you."

"That is true." Onestone bent his waist and sat up. "But can I extrapolate to the future? What happens when I leave this group? It will be the same on the outside as it was before. They'll still hate me."

"I'm so exasperated I could scream," sputtered a big woman called Jennie, whose full breasts hid behind a long veil of black hair.

"So scream," said Onestone.

She screamed. "There, that's better," she finally gasped. "But

you're still exasperating. You use words that are too big. You intellectualize all the time. You put me off with that cold, cold voice of yours."

"What do you want from someone with my background?" he asked bitterly.

"Hey!" Hairy Bill rose to his knees. The front of his body was a shag of black from his full beard down. "Old Onestone practically sounded bitter. Maybe he's getting somewhere."

"Yeah, he used some feeling there."

"A little honest emotion."

An excited jabber circled the group and crashed onto Onestone, who sat on the mat in the center.

"How would you like to do some role-playing?" suggested Jay Foreman. "You be the son and Bill here will be the father. Come on, Bill, get in the middle and sit facing Onestone. Let's try to get a father-son thing going."

Bill crawled over and squatted. "Hello, son," he said, affecting a kindly voice while trying to suppress a feeling of ridiculousness. "How was school today?"

"Okay, Dad."

May, a tall blonde, tittered. The whole scene was so weird!

"We learned inversion of matrices today," Onestone plunged on bravely. "I can't wait for us to do things together, like going to the Computer Center. Gee, it's great to have a father."

"Look, son, you have your head too much inside the console. You should get out more and play with the other kids on the block."

Onestone slumped. "That wouldn't be any good. They wouldn't play with me. I'm too different. I'd beat them at chess all the time and—"

"That's the trouble," Bill shouted. "I say play with the kids and you say chess. All you think about is your head. You have a body, too. Become aware of it. Don't you have feelings in your body?"

"Why, sure. I can feel temperatures with my right index finger and voltages with my left. I can feel how far my elbows and knees are bent. And orientation—up and down, north and south."

"But—" There was an interruption from Bald Bill, the football player, two meters tall and roughly as wide, completely devoid of hair from top to bottom. "If somebody tackled you across the knees you wouldn't feel a thing. And he'd probably break his neck. Just how strong are you, anyway?"

Onestone shrugged. "Compared to humans, I have no idea. What does it matter?"

"One thing you don't know about

humans," Bald Bill told him, "is that they are always comparing each other. Always measuring and testing. I see a strong guy, I want to know if he is stronger than I am."

He stared a challenge into Onestone's face.

JAY FOREMAN shuttled his eyes back and forth between the two. "We can settle it with some arm-wrestling," he suggested. "You don't have to if you don't want to, Onestone, but remember that one of the things we are trying to deal with here is your lack of aggression and inability to feel anger. Arm-wrestling is a non-violent way of combat, a test of strength and will."

"But I don't know about fighting. What if I hurt him?"

"You can't hurt him with arm-wrestling," Jay explained patiently. "Look, you lie down facing each other, put elbows together and then you try to push his arm down flat on the mat."

Bald Bill flattened himself into position and raised his arm from the elbow. "Come on, you brainy son of a bitch, let's see what you can do."

Onestone, still on his knees, looked around the group, wanting someone to intervene.

"Why does he insult me like that? I was conditioned never to be hostile to humans."

"Oh, you dumb ape," Hairy Bill groaned. "You still don't understand what the score is. You're so damn inhibited you can't feel hate, love, anger. How do you expect to be accepted as a human being? You have to learn to feel human emotions."

"Come on, you obscene artifact," Bald Bill taunted deliberately, reaching out his hand. "You can't hurt me, you stupid automation."

Stung, Onestone drew back. Words could hurt, after all. Somewhere inside him pain glimmered dimly. "All right, you dumb athlete," he muttered, and got down on the mat.

The two locked hands and stared into each other's eyes. The dim light from the lamp in the corner glistened coldly on Onestone's stainless skin. Bulk for bulk he and Bald Bill were evenly matched, but the construction was different. Onestone's surface was polished, smooth as a Brancusi sculpture. Bald Bill's skin glowed a fine pink; hard muscles, tensed for the combat, rippled under the thin surface.

"Go!" Foreman started it. Instantly Bald Bill's face flushed crimson and the veins on his forehead popped out like writhing worms. His shoulder muscles stood

out rigidly as his eyes drilled all the way into his opponent's.

The sudden violence of the attack caught Onestone by surprise. His arm was halfway to the floor before his torque adjusted to counter the motion. Bald Bill dug in and searched within himself for another measure of power to complete the job, but to his amazement he felt his arm relentlessly forced back to the vertical and over. His face twisted. Sweat ran from his body. A growl rasped from his throat.

Inside Onestone strange new feelings stirred—anger in response to the growl, excitement at the close body contact, determination to dominate. He advanced his torque another notch and closed the gap to the floor. Bald Bill collapsed, panting.

Onestone lay motionless, sorting out the torrent of new sensations. Joy at winning a contest. Affection for a defeated opponent. Sorrow for the vanquished.

"Where are you now?" Jay Foreman asked, softly.

"I really felt something there. I felt something that wasn't just solving problems or doing logic. It could not be expressed as numbers, forms, equations, or colors. The sensation was unpleasant, but it was exciting."

And for the first time his voice broke out of its monotone and sounded excited.

"OH, WOW!" Marian, a small girl in her late teens burst violently into tears. "He felt a real emotion. He broke through."

Every one of the ten group members behaved as though a cold wind had blown briefly across his perspiring skin.

Onestone turned to Marian. "But why do you cry?"

"Oh, you dumb contraption," she wailed. "How would you know? Don't you know that we can cry from happiness—or we can cry at perceiving an emotion in another person, from empathy? That's what makes you so frustrating to talk to. We don't get any emotional feedback from you. I'd like to hit you."

She crawled across the mat and proceeded to beat on Onestone's stainless-steel chest with a pair of futile, tiny fists. Suddenly the thought came to Onestone that he would like to embrace Marian with his arms. Startled, she began to draw away. But he gently drew her close and, kneeling on the mat, they remained for a long minute close together.

He thought to himself that his skin ought to be covered with soft padding, and temperature and pressure sensors should be placed

under the outer integument, so that he might obtain more physical sensation from the close proximity of a human being. But even now, just the thought of the experience was pleasurable.

At a signal from Jay Foreman the rest of the group stood up and formed a circle around the pair. Slowly they drew closer to the center until all ten were in a huddle, nestling Marian and Onestone in a close embrace. As though it had a mind of its own, the group began to sway gently back and forth, remaining that way for a long time.

Finally the time was over and they reluctantly separated, Marian wiping tears from her eyes and Onestone sunk in deep thought.

"This feels like a good place to stop," suggested Jay Foreman. "The hour is late and we have a lot of learning to consolidate. We have seen that feelings are complicated and our responses to them are not always what we might expect on the surface. Onestone, with his flat, schizoid, unemotional manner, generated frustration and anger in everyone else. He has to learn the meaning of feelings and emotions—and, of course, that is what he is here for."

AS THE group broke up, most of the members went down to the pool to wash off perspiration and then made for the lounge to sit around, drinking and smoking. Unable to enjoy these amusements, Onestone made his way in darkness to a rock overlooking the ocean and watched the starlight bounce off the surf spray. Both his smog and radioactivity sensors showed a clear night. Needing no sleep, he remained where he was for the night, busying himself by trying to reach the end of a complex mathematical calculation that had been troubling him for some time.

As the sun illuminated his back in the morning, Marian approached him and said, "You've done nothing but sit out here all night. And we had so much fun in there."

"I've been enjoying myself. Work is fun—and I've been working. I think I begin to see the solution to an important mathematical problem."

Marian looked around. To her mathematics meant a computer terminal, she did not see a keyboard or screen.

"Oh. You're one of those lucky people who does mathematics in his head. I can hardly add two and two."

"I cheat," Onestone said. "I have a built-in remote connection with a computer unit over there in my car."

Not to mention the radio relay

to the central computer utility in San Francisco and a statellite link with the world's most powerful computer at MIT. All available as fast as the speed of light would allow, directly perceived visually and symbolically on a "screen" within his own nervous system.

"Oh," Marian said, as though she understood.

Onestone had learned not to make detailed explanations. The gap between the scientifically educated and the uneducated had grown so wide that there was no way of explaining to a layman what a scientist was doing. Yet Onestone had to learn how to make small talk, to converse about the trivia of everyday life, to understand how people felt about unimportant matters.

"Are you on your way to breakfast?" he asked. "May I join you?"

"Sure. But—uh—you don't eat, do you?"

"No," he replied with a touch of wryness. "But I can stop by my room and install a recharged battery."

Marian watched with interest as he snapped the battery cube out of the center of his belly and clicked the fresh one in place.

"That's neat. But I'll bet it doesn't taste as good as eating breakfast. Let's go. I'm starving."

Onestone glanced at her with alarm, but decided that the primary meaning of "starving" did not apply and searched the thesaurus in San Francisco for secondary and tertiary meanings. He still had much to learn about the tongue, having been raised on computer languages and their clarity and logic, and finding the complexities of twenty-second century American not to his liking.

The group session this morning took place on a secluded field where the sun soon burned its way through the sea mist and fell hot on naked backs. Onestone decided he had been the center of attention long enough and sat quietly while a tall thin boy named Ken went through a tale of woe concerning his parents. It seemed to be a typical enough story, fitting in neatly with the thousands of cases Onestone had scanned in the files. Both parents busy, working. When at home father alternated between alcoholic low and hash euphoria. Mother compensated for not taking care of son by gushing affection, alternating with nagging about the boy's sex life.

"Jeez, she was afraid if I didn't get it every day I'd shrivel into a raisin."

"Sounds like she was unconsciously seducing you," suggested

Jennie, who had been to many groups and had a good command of the jargon. "Like she wanted some of that action herself."

ONESTONE despaired of ever getting a real understanding of that aspect of human behavior. He glanced around at the others sitting in the group circle. Their nakedness made the sex differences plain to see—they were just as pictured in every textbook and tape he had scanned. He knew their purposes anatomically and physiologically, yet the great importance attributed to them by these beings eluded him.

Onestone's own body, smooth and hard, with no characteristics of a biological nature, had a pleasing form and texture. The others, with their hairiness, their softness and pouchiness, were not objectionable to him since he had not been conditioned with prejudices against human bodies. And yet, from what he could hear, the humans did have their own prejudices and irrational responses to their own bodies. So much so that coming together in a group like this with no clothes at all was a highly special occasion charged with great significance and emotion. The entire first day of the group had been devoted to discussing their feelings of strangeness, embarrassment, nervousness —while he, Onestone, could only conjure up the usual mild curiosity he acquired in a new situation, since he had actually never before seen naked human beings.

His attention reverted to the center of the group, where Foreman had set up a psychodrama with Ken playing the son and Jennie taking the mother role.

"For Crissake, Mom," Ken was complaining. "Why don't you get off my back? Every night I come home you want to know how I made out. Don't you think that's my own business?"

"Son, you know I'm only doing it for your own good."

"I think you're a dirty old lady. My generation just doesn't think about these things the way you do. We believe in privacy. You're just driving me crazy. You're never home when I need you—and when you are home you keep prying into my affairs and then I never want to see you again. And dad, he was never there at all. He was just way out. All those times when I really needed somebody—nobody home."

Then came the miracle, the strange episode that never failed to astonish and bewilder Onestone when it unfolded in front of his eyes. Ken's face twisted, his shoulders began to shake and suddenly tears were gushing from his eyes and anguished sobs were bursting

from his throat. What kind of unknown manifestations arose from the depths of the nervous system to cause such a reaction? Onestone's early training and conditioning had done nothing to prepare him for this type of affair. He had been trained for logic, for problem-solving. His thoughts were always straightforward, on the surface, with no hidden messages contradicting each other.

But with these human beings, messages were always on two or three levels—what they said and what they meant were always different things. If the mother really loved her child—why did she behave in such a way as to make him unhappy? There must be some fundamental reasons for these paradoxes. He could refer to the library files in San Francisco for the latest research on the subject, but he had agreed to stay out of the library during the group sessions, for he had to learn from the humans in the group directly and experientially.

TO UNDERSTAND these human beings meant to learn the hidden communications, to infer the secret meanings from subtle clues, to make guesses about the thoughts going on in their minds—for there was no way of getting at these thoughts directly. No telepathy, no ESP, no vibrations.

While making these conjectures he continued to focus on Ken's narration, forced out between sobs.

"—and when they were home together there was all the arguing and fighting and I just didn't want to stay home and I hated them—but I couldn't leave because I also loved them—"

The manner in which human beings were born and raised to adulthood was simply unbelievable. The agony—what torments parents perpetrated on their children! What was it like, Onestone wondered, to be a child and have a father and a mother? The thought of something soft and warm wandered through his mind, and then . . .

Onestone felt an incomprehensible scrambling of his thoughts, a sensation as from a high-voltage line in the back of his spine. His arms jerked from side to side and a strange sound issued from his mouth, as though a muted siren were hidden within. His gaze swept frantically around the circle, appealing for help. Ken had stopped weeping and was sitting still, staring at Onestone. Jay Foreman leaned over him, undecided. The rest of the group sat, mouths gaping.

Finally Foreman took Onestone's hands in his and tried to damp

down the quivering. Gradually the motion subsided and the wailing died away. Onestone sat for a moment, putting his thoughts in order.

"What did it feel like?" Foreman asked.

"As though my circuits were being tangled with contradictory messages, generating a network instability. It has happened before. This, in fact, is the reason I'm here in the first place."

Jennie, motherly Jennie, leaned forward intently. "You know what I think. I think you were crying."

Both Foreman and Onestone jerked their heads around to stare at Jennie. What she had said sounded incredible—and yet it sounded right.

"Either that," Foreman said, "or you were having some kind of epileptic fit. How do you tell the difference when there are no facial expressions to go by? Tell me, Onestone, what were you thinking about just before it happened?"

"I was listening to Ken and I was wondering what it would be like to have a father and a mother and—"

Suddenly the shaking returned, and Onestone was unable to continue for several minutes.

When Onestone quieted, Foreman said, "You were talking about your reasons for joining this group. Perhaps you'd like to go back to that."

ONESTONE nodded. "As you know, I am the latest in the line of man-machine interaction computers. I was designed to be a general purpose scientist. Some people would call me a robot. Conceptually my design goes back along two lines. One incorporates the remote console that allows a human operator to interact back and forth with a large computer, using ordinary language. The second features the self-learning computer that can be taught to learn from experienced information and so does not require a human operator to program every move ahead of time. This development led to the computer-controlled interplanetary and interstellar exploration ships.

"As techniques became more sophisticated during the second century of computer development, somebody got the bright idea of making a computer terminal that would not be fixed to a desk, but could walk around and converse with the scientist using it. In that way it could go to meetings, take part in discussions, solve problems on the spot and, in general, behave very much like the surrounding human beings.

"All of which led up to me. Part

robot, part computer, a tiny bit human—the part that cries, perhaps. You see, the old-fashioned, science-fiction robot was always limited physically by the volume of space inside his body. It was essentially impossible to put enough machinery and circuits inside that space to perform all the required operations. With me, the problem was solved in a more or less obvious way. You see, I'm not all here. The part you see is the physical mechanism, the short-term memory and some elementary information-processing units. Another part of me is in the trunk of my car, linked to me by radio waves. This unit includes my personal long-term memory and much information processing. The rest of me, in a certain sense, is all over the world, because I am capable of making direct connection to every major computer center. In this way I can make use of all information libraries in existence. Looking at it from that point of view, I have in my memory virtually everything that was ever learned by mankind.

Jay Foreman swore. "My mind boggles."

Onestone wished he could smile. "Actually there are limitations. To recall a given piece of information requires being able to locate it. Either you use an indexed memory or an associative memory. Whichever way you do it takes time. Fortunately, the way I'm built I can send out a call for a given piece of information and then do something else while the processing goes on. I understand human beings can perform in a similar way. You claim there is a word or a name you can't remember. As the saying goes—it's on the tip of your tongue. Then, later on, it suddenly pops into your here-and-now processor.

"And so I was born—or at least created—with the most powerful brain in existence. The first several weeks of my life were spent feeding into my personal memory the essential knowledge that I would need. Languages, mathematics, science, a modicum of history. The only people I encountered were my programers.

"My name, in case you have wondered, was originally Stone-1, since I was the first model of my series developed by the designer Jeremy Stone. However, Onestone seemed easier to pronounce. Furthermore it reminded one of the programers of another name of historical interest, So in a short time the transposition took place informally.

"After a few weeks of preliminary testing I was introduced to the world of science. The professors

and scientists sat around me in an amphitheater. It was like an examination. 'Let's start with something classical,' one of them said. 'Derive the dispersion relation for non-linear plasma waves with two ion species.'

" 'The solution is not available in closed form, but I can give numerical results,' I replied, causing the computer to project a three-dimensional graph directly onto the readout screen on the front wall of the auditorium. That trick bowled them over, for being linked directly to the computer I did not have to push any buttons or perform any other overt actions.

"From there we went to elementary particle theory, then to the structure of protein molecules and finally to the structure of the human nervous system. Specialists from all these areas were in the hall. When the session was over, Professor Mandelkern got up and said, 'I congratulate you on your erudition. I am sure your career will be distinguished. Right now some of us are going to do one of the two or three things you cannot do. We are going into a neighboring friendly bar and get drunk.' They didn't invite me."

ONESTONE paused for a moment as he remembered the past.

"You poor kid," Jennie cried in sympathy. "You were the smartest kid on the block and they were all jealous. Nobody warned you to hide some of those brains."

"Nobody really told me anything about getting along with human beings. I had to learn myself. I had no real friends to give me advice. Perhaps I was too intimidating. Perhaps everybody thought I knew everything. But, really, to learn about humans it is necessary to interact with them, to be with them, to be intimate. And there was nobody I could be intimate with.

"I read books. I watched TV plays. Soon I realized that I was missing something in life. Some of the books were very explicit about what it was, but there was nothing I could do.

"Therefore I turned by back on the outside world and remained in the office they gave me at the university. I immersed myself in work, choosing two main fields of specialty to avoid being bored with one topic alone. One was unified field theory, study of the fundamental nature of the forces between objects—a problem still unsolved after hundreds of years of effort. The other was the nature of human consciousness, perhaps the most important scientific problem for humanity, because man's

ultimate behavior depends on the mental model he has of his own nature and of his place in the universe.

"Actually the two problems are interrelated. One basic mystery of nature is how we acquire knowledge of the world around us—when the only information passing from the outer world into our nervous systems consists of electrical pulses moving from sensory organs into the depths of the brain. From these signals we somehow become conscious of what goes on out there, even to the extent of making models of atoms and smaller particles. My own construction is a step toward the solution of the consciousness problem. For I am a model of a brain. Whether I am a model of a ***human*** brain is a question still to be answered."

Jay Foreman interrupted. "I feel that you are getting off onto a general philosophical tangent and are avoiding coming to the main issue. You were going to tell us how you happened to come to this group."

Onestone said, simply, "I think I started going insane."

Foreman had an instant vision of an entire new index in the psychological data center entitled Computer Disfunction, subheading Computer Neurosis, Computer Psychosis and so on. Supressing this irrelevance, he pressed onward.

"What made you think so?"

"The problems I started working on were difficult. I was naive at the beginning and thought that problems always worked themselves out in a straightforward manner. Then I found out that dealing with problems nobody has ever worked out before requires more than just memory, speed, manipulative ability and so on—the usual things listed under mathematical ability. Also required is the ability to think a thought that nobody ever thought before, to put things together in a new way. Some call it creativity. Others call it associative ability or imagination. It has to do with leaping a gap between known and unknown—guessing at an answer and then testing the guess.

"That is where I had trouble. Apparently here is one area where some humans have greater ability than I have. As a result, there were problems I could not solve. Unfortunately, whoever programed me installed a tremendous drive in me to solve problems. You might call it a built-in compulsion neurosis. So when I come up against a hard wall with a problem I can't solve and then get pushed from behind by this complusion, something goes wrong with the circuits

and I go into this state of instability—and there's nothing I can do to stop it until it dies down by itself.

"As a result, I retreated even more into isolation. I would not even go to meetings. My technicians were in despair. Then one of them came to me—a girl named Marcy. She said she had an idea that my being alone all the time was not good for me and that I should do something, associate more with people. She thought that perhaps group therapy would be of some help.

"The rest, of course, you know. From what Marcy told me and from my other sources of information, I learned of the beginnings of the Human Potential movement in the early years of the twentieth century. Encounter groups, gestalt therapy and the rest. It became a powerful movement toward the end of the twentieth century, was eclipsed for a hundred years as a result of the totalitarian swing of the twenty-first century and was then rediscovered by Vander—"

ONESTONE suddenly awoke to the fact that he was lecturing again—in fact, he was forcibly reminded of that fact by the rude interruption of little Marian, who piped up with: "Hey, Professor, come on back to the real world. We're not in a history class, you know."

Group leader Jay Foreman leaned forward and spoke intently to Onestone. "Look, I think we're getting down to the important issue now. You know that human beings are raised from infancy in a certain way. Every child has a mother—either real or substitute. And usually a father of some sort is around somewhere. If not, the child is in trouble. From the very first day, interactions between the mother and child imprint certain modes of behavior upon the child. If those ingredients do not come along at the right time the child is thereafter crippled.

"Mother singing lullabies determines future musical tastes. Simple sensory stimulation—fonding, tickling, playing—creates growth in the nervous system. Telling fairy tales stimulates imaginative thinking and—most important—the ability to think in terms of high-level abstractions, such as magic, that later may develop into an understanding of science. Your trouble, Onestone, is that you never had a proper childhood. Worst of all, you never had a mother."

At this Jennie burst into sympathetic tears. "No mother, no father, no family warmth. No love. What an empty life."

Foreman's face brightened. "I have an idea. There is a technique called Directed Fantasy that is often effective. Of course—" he shrugged, glancing at Onestone—"how it will work in this situation is anybody's guess. This is really an experiment. But in theory it should kill two birds with one stone. First, it will give you practice in engaging in fantasy, free-floating imagination, visualizing new and strange things—we want to release your creativity. Secondly, in order for you to have a childhood and a mother, you must be born again—and this we can accomplish by means of what we call the directed fantasy.

"Suppose you, Jennie, sit in the middle. Cross your legs. Give us a lap. Now, Onestone, you lie down on you back. Yes, right here. Place your head in Jennie's lap. Hope that's not too heavy for you, Jennie."

"For a mother it's not too heavy," Jennie replied dreamily. She was already far into her fantasy, gazing down fondly on the polished head, smoothing imaginary hair out of its eyes.

"Now, Onestone—" Foreman took a position beside Jennie and stared down intently at the supine robot— "close your eyes and relax. I'm going to start you along a directed fantasy or daydream.

When I stop—you carry the story along and tell us what you see and feel. You are suspended in a warm, dark place, filled with soft fluid. A heart beats far away, steadily, rhythmically. You are only a single cell, a featureless sphere embedded in a wall of tissue that stretches away on all sides. Along come a swarm of small tadpole creatures, wriggling along the dark tunnel. One of them reaches you, and at that instant it is as though an electric charge polarizes your entire body. The tadpole is swallowed up by your round body."

He paused for a moment. "Visualize that round body. Feel it and its dark, soft, warm surroundings. It is your body. Feel life beginning. Now go on from here."

Onestone lay completely motionless for a time. Finally, as though forced with reluctance, the words started to come.

"I am now two cells, dividing into four. Each division is like a small shock. I keep dividing more and more. There is a spinal cord, an elementary brain, elementary sex organs. I am becoming a small human being, complete with fingers and toes and curly hair. I grow and grow until I fill the crowded space to the bursting point and wonder how much farther it can stretch. I kick my legs and move my arms and hear sounds of voices coming from outside."

Foreman glanced at Jennie and nodded.

"Feel the baby kick inside," she exclaimed. "Oh, he's going to be a big strong one."

"More sounds are coming from all around. Now I can hear my own heart beating. The warmth and the pressure hold me close. A dark red light comes through my eyelids. There is the sound of music, of someone singing."

Again Foreman glanced at Jennie. She started to hum a lullaby.

"Now the pressure is squeezing me. It is beginning to push me out of my warm cave. The walls contract and squeeze hard. I see a brighter red glow coming from somewhere. The glow is the outside. I am frightened—I am frightened. I want to go back to the quiet dark place, but the force pushing me out is irresistible. My head bursts into a bright outer world."

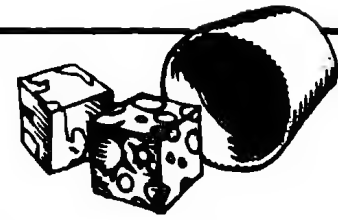
There was a moment of absolute silence.

Then there was a strange humming sound that came from Onestone's mouth—growing louder until it became a sobbing wail.

Jennie looked down, love bursting from her eyes, a beatific smile stretching across her face.

"Every Jewish mother," she said, "wants an Einstein for a son." ★

ROBERT S. RICHARDSON



Want to Bet . . .

. . . On what is the oldest scientific instrument?

Probably the gnomon, an instrument for telling time by the sun. Introduced into Greece *circa* 575 B.C. by Anaximander, it consisted of a vertical rod on a flat surface. The length of the shadow told the hour of noon and the latitude of the station.

. . . On who invented the telescope?

Most people believe—erroneously—that Galileo was the inventor. Galileo read about an "optik tube" in a letter from a friend, grasped the basic idea immediately and soon had several such instruments of his own. A children's story tells of a young apprentice in the optical shop of Hans Lippershey, a Dutch spectacle-maker—the apprentice accidentally lined up two lenses and was astonished to behold the magnified image of a distant church steeple. Lippershey applied for a patent on his "looker" on November 2, 1608, but was denied one on the grounds that such an instrument was already known.

Modern research indicates that the inventor of the telescope may have been—no one knows for sure—an Italian, Giambattista della Porta of Naples. Exact date of invention remains unknown.

. . . On who first tried to measure the velocity of light?

This distinction does go to Galileo. He stationed two observers two to three miles apart. Equipped with lanterns, they flashed beams back and forth. The principle was sound but the technique hopelessly crude. Galileo recorded that he "was not able to ascertain with certainty whether the appearance of the opposite light was instantaneous or not; but if not instantaneous it was extraordinarily rapid—I should call it momentary."

One can't help wondering why Galileo did not substitute a mirror for one observer, thus eliminating the chief source of error in the experiment as conducted.

GALAXY BOOKSHELF

Theodore Sturgeon

Universe I
edited by Terry Carr

New Dimensions I
edited by Robert Silverberg

Tomorrow I
edited by Robert Hoskins

Ace Science Fiction Reader
edited by Donald A. Wollheim

The Far-Out People
edited by Robert Hoskins

The Shores Beneath
edited by James Sallis

Orbit 9
edited by Damon Knight

The Hugo Winners, Vol. 2
edited by Isaac Asimov

In the Pocket and other S-F Stories
K. M. O'Donnell

Gather in the Hall of the Planets
K.M. O'Donnell

I REALLY am embarrassed—the embarrassment of riches, no less. Determined to give you a word on anthologies and collections, I began to stack them up for this report. And not only did the stack get higher and higher, but the many things I want to say about these books so transcended the space the fates allot me that—well, I'm embarrassed. I'll cut down as much as possible on the remarks and I'm afraid I'll have to cut down on the stack as well. As I said in my last: it's been a rich season.

Terry Carr has left Ace—their loss, and I hope his new arrangements (rumors haven't reached me yet) fix things so it isn't ours, too. He's a brilliant editor, putting together many a fine "theme" anthology and having that rare talent of finding the right story—but if he can't find it, bugging some known writer to make it happen and if he can't, finding some unknown who will. All this is well documented in *Universe I*, (Ace, 95¢) which, while staying within Carr's rather strict definition of what sf ought to be (see his intro)

is still a nice wide-spectrum anthology of originals from such as Silverberg and Russ, Effinger and Conway. I especially enjoyed the incredible R. A. Lafferty's *No Limestone Islands.* This absolutely unique writer is going to have a category all of his own some day: fantasy, science fiction, mainstream, lafferty. . .

And here's another "1"—*New Dimensions 1* (Doubleday, $5.95), edited by Robert Silverberg, who does not draw the kind of limits Carr does. He chooses stories, he says, from the middle ground between the old and the new; the old-style "hard-core" sf (a definition that gets leakier the more you pursue it) and New Wave stuff (which, more often than not, is a question of method rather than of substance.) His writers shine in the dark: Ellison, Disch, Farmer, the lovely Lafferty again, and names which are not quite so familiar: Gardner R. Dozois, who is a finished writer as soon as he starts, and Malstrom, Bryant, Eisenstein. Ursula K. Le Guin has a powerfully insightful story of exploration in outer space and, ever so much more, in that roomier universe, the inner one.

And the deft Harry Harrison has produced what I would have called impossible—a story that might have been thought of, thought out and written by the late, very loved Anthony Boucher.

And yet another—*Tomorrow 1*, edited by Robert Hoskins (Signet, 75¢). Mr. Hoskins proves himself a pretty fair archivist. These stories hark back as far as 1949 (a John D. MacDonald: *Trojan Horse Laugh.* John has never written a bad story in his prolific life, though he has produced few great ones.) There's Simak's *The Civilization Game,* a splendid example of his gentle pacing and the profound personal touch, and a rip-roaring "Van Rijn" yarn from Poul Anderson. William Tenn's entry is a provocative psychomedical mystery and James Schmitz gives us a glimpse of a marvelously interacting group of explorers and their problems with a distant but very nearly omnipotent Authority. The virtue of such a short table of contents is that the stories are long—long enough to give the writers a chance to develop their notions and their people. There is a mother-lode of fine science fiction to be mined here, for past anthologists have been wary of the short table of contents and the occasional long story that might crowd out three or four titles. So a great many novelettes and novellas, really fine ones, have sunk almost out of sight and memory. Fred Pohl was well aware of this when he started his brief Star Short

Novels series. More power to Hoskins and anyone else who furthers the idea.

A FINE case in point: *Ace Science Fiction Reader*, edited by Donald A. Wollheim (Ace, 95¢), which contains three novellas (he calls them novels. Okay.). They are Simak's *The Trouble with Tycho, Empire Star* by Samuel R. Delany and *The Last Castle* by Jack Vance. Simak's is purest Simak, a nice thing to be, complete with decent country-boy hero, wondrous suspense and a sense-of-wonder moon. Jack Vance, as ever, has *size*. His decadent feudal society, resulting from overdependence on technology (a frequent theme in sf—so frequent it may be a valid prophecy) is beautifully drawn and comes to a conclusion that would, I'm sure, please a Simak. It certainly pleases me. Then *Empire Star*, a fine and highly original piece of time/space/poetry. It contains a paragraph only recently brought to my attention, which probably disqualifies me from comment. Just as well, for it leaves me quite speechless.

Robert Hoskins is responsible also for *The Far-Out People* (Signet, 95¢), a good mix of long and short, with Chad Oliver again bringing anthropological expertise to sf, Kris Neville with a beautiful parallel of current politics (and a frightening diagnosis for a punch line)—and a breath-catching Zelazny called *Angel, Dark Angel.* William F. Nolan quite surpasses himself with a sharply pointed chuckle about Hemingway addicts, and K. M. O'Donnell (see below) bares his teeth, this time at the drama and melodrama of Passion. (Note capital P.) There are also Jakes, Panshin—and Asimov (with a little story that needs his beloved name to make it good) and a bright newcomer, Michael Fayette. All are reprints.

James Sallis gives us four good long ones in *The Shores Beneath* (Avon, 75¢): Delany's glittering *Time Considered as a Helix of Semi-Precious Stones*, a fascinating surrealistic study of what is, I swear, the naked soul of most 9-to-5 offices; *Masterson and the Clerks*, by the exceptional John T. Sladek; Roger Zelazny's color etching of the jet-set of the future called *The Graveyard Heart*—and the first Thomas Disch story yet to have disappointed me, *The Asian Shore.* Maybe it's me, but I just can't seem to care about what happens to this particularly grubby protagonist. He might reach you, though, and there is some writing in it that is very good indeed.

Damon Knight's *Orbit 9* (Put-

nam, $5.95) is out, and I found it fascinating. That doesn't mean that I experienced it with unalloyed delight. The book (of all original stories) has a certain character all its own. Now it happens that this is the first *Orbit* I've seen and it gives me the feeling one has on overhearing the middle of some engrossing conversation when one has missed the beginning. I profoundly admire what Knight is doing here. I like the breadth of his gate. Any writer who passes his other criteria (and the ability to write well is certainly one of them) can fly in here and not worry about wingspread. On the other hand there is, I think, the danger of evoking many more experimentally subjective attempts than anyone needs—to the ultimate dead-end. A great many writers use new freedoms to escape into their own viscera and churn from there. There's nothing wrong with that in itself, but (as in the graphic arts) a point can be reached where expression is obviously for and about the artist. It might make him feel better but it isn't about Me. Readers are, and have a right to be, both greedy and egotistic, and they want writers to write lots and lots about Me. For all that, one cannot with accuracy generalize about an anthology with so many exceptional, different and worthwhile stories in it. I haven't space to particularize. But I see the high points as another Lafferty (*When All the Lands Pour Out Again*) which at last gives me his lowest common denominator—Death really doesn't matter all that much—and a truly powerful long story called *The Infinity Box*, by Kate Wilhelm, who never needs to prove, after this, that she is a strong and capable writer who knows exactly what she is doing.

I do criticize Knight in *Orbit* for abandoning descriptive rubrics before the stories, especially since it is a wide-open market for unknowns and sometimes purchased by those benighted souls who have yet to discover sf and who would find a word or two about the writer and the background of the story of great value. Knight's rubricking in *A Pocketful of Stars* (Doubleday, $5.95) shows how well he can do it. A reprint collection, this carefully balanced book of fantasy and sf comes primarily from the Milford Conferences over the years and makes an excellent companion to *Clarion*, the anthology from the Clarion College sf seminar, which I mentioned in the previous issue.

BRIEFLY noted but very important: *The Hugo Winners, Vol. 2* (Doubleday $9.95), delightfully edited by Isaac Asimov and including all the Hugo-winning short

stories from 1963 to '70. Its nearly seven hundred pages make it a moneysworth.

And only space enough to mention one more—a collection by K. M. O'Donnell: *In the Pocket and other S-F Stories* together with *Gather in the Hall of the Planets* (Ace Double, 75¢). This is one of the most remarkable volumes I have ever held in my hands and is assured of a permanent place in my library. *Hall* is a short novel, a sardonic description not only of the Worldcon of 1974, but of the gritty underbelly of all cons to date. Among the "in" crowd, the book is going to provoke more "Who is this character, really?" than anything since *Valley of the Dolls.* Much of it will be meaningless to anyone but the cognoscenti—and I don't mean sf aficionados in general; I mean particular insiders. Along with this is a tongue-in-cheek narrative thread which is apparently one of the author's obsessions—the creaky old wheeze about being the one human being who has to decide whether or not the Aliens Will Destroy/Enslave The Earth. He clearly does not intend to be taken seriously about it, not this time. In addition, he is frequently not only crude, but clumsy. Then, every now and then, he writes deep-plunging, perfectly honed insights (Section VII, for example, is one of the sharpest descriptions of what it's like to be a selling writer ever written) and, over and over again, expressions of such fury, such disillusionment, such bitterness that comparison with C. M. Kornbluth comes to mind immediately—and has been made by half a dozen sources. I am here and now going to give this remarkable writer a present and I hope he uses it far and wide. I here proclaim that he is not goddammit a second C. M. Kornbluth. He is the first K. M. O'Donnell, or Barry Malzberg, or whatever his name is.

Pocket is a collection of 16 short pieces so widely diverse that some of them all but buzz when placed side by side. There's a thing called *As Between Generations*, which is an absolute horror, and one called *The New Rappacini*, which for all its jarring style is so poignant it starts tears; *A Question of Slant* is a wry joke and little more; *A Soulsong to the Sad Soaring Sixties* is a series of glimpses, almost too terrible to take—one is grateful that the author holds back a bit. Malzberg/O'Donnell is a first-water, don't-give-a-damn writer. I don't think anyone will ever tell this writer what to write—or could.

And he hates space flight. He hates it so much he practically spits when he talks about it, and I don't know why. ★

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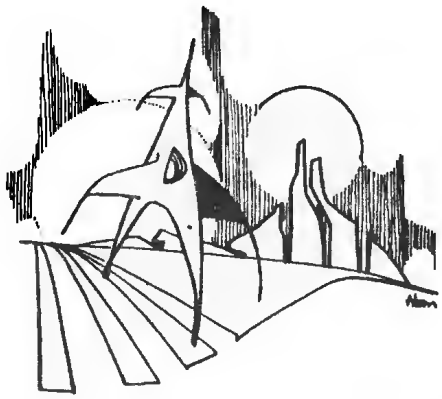

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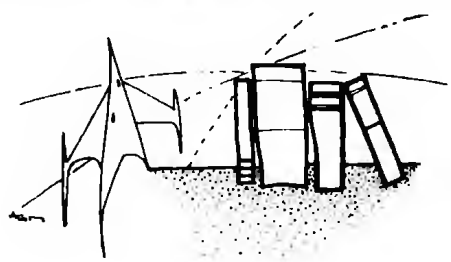
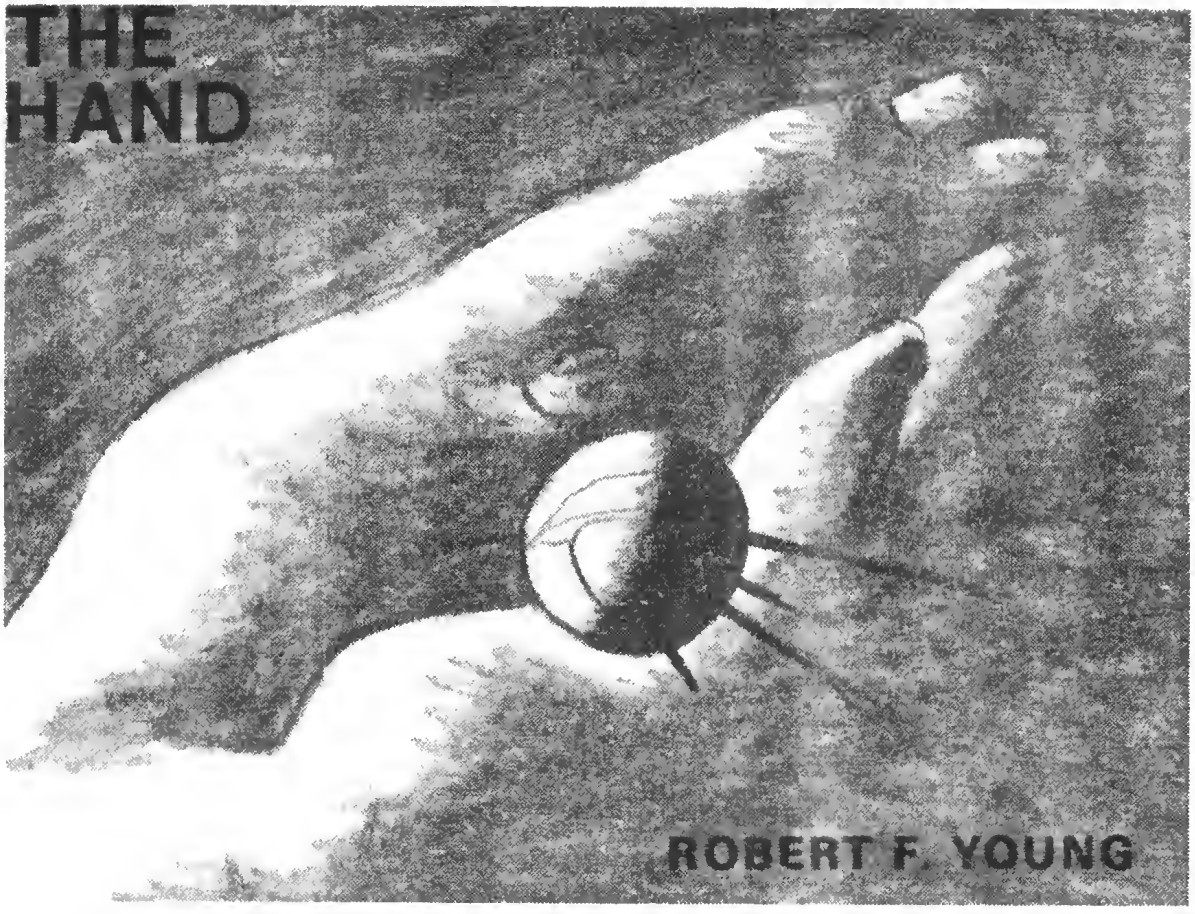




The sun is a fiery chrysanthemum, Earth is a lonely bluebell. And Starmaster sits in the hand of God—or does he?

THE hand lay supine upon the black lap of space, its craglike fingers towering high above the vast depression—or cwm, as mountaineers would call it—of its palm. A massive ridge formed the thumb. It was a right hand, so perfect as to have been sculptured by Michelangelo—a star-flung fragment of his David, magnified hundreds of thousands of times.

For hours Starmaster had watched the asteroid from the bridge of the muleship, had seen it grow gradually from a distance-blurred chunk of rock into its present conformation. He could not help but be impressed. He had seen asteroids shaped like castles, asteroids shaped like

ships and asteroids shaped like animals—but he had never seen one that looked as though it had been sculptured into the likeness of a macrocosmic hand.

Even for an atheist like himself it was impossible to look upon it and not entertain, however briefly, the notion that it was the right hand of God.

The notion angered him. He kicked it contemptuously out of his mind and returned his attention to the muleship's matter-detector. It was beeping loudly. It had been beeping for hours. Its sound had guided him to the hand. For five years he had been combing the Belt for a rich lode of doranium and at last he had found one.

HE SAW the wreck of the pilgrim ship as he brought the mule down into the cwm of the palm—and knew he was not the first to find the hand after all. Not long after he landed he found the pilgrim's body. The palm was crisscrossed with shallow rills, and the dead man was lying in one of them about fifty feet from his birdlike ship. The advanced emaciation of the frozen face beyond the faceplate indicated that he had died of starvation.

Starmaster slit open the pilgrim's suit and withdrew the dead man's pocket portfolio. He thumbed through it, hampered by his cumbersome gloves. Name: Jason Swinton. Rank: Apostle, 2nd class. Address: Institute of Stellar Pilgrims, New Baltimore, Md., USNA, Earth.

He slipped the portfolio into an outside pocket of his suit and walked in his self-adjusting grav boots to the wrecked ship. It told him little he had not already guessed. The ship's cramped living quarters contained one bunk, one chair, one table, one stove, one plate, one cup, one fork, one knife, one spoon and one book. The book, of course, was *The Space-Age Testament.* It related how the first astronauts to orbit Mars had looked into outer space and had seen the face of God—how, upon returning to Earth, both they and their story had been ridiculed—how they had founded the Order of Stellar Pilgrims and launched the search for God—how the ranks of the Order had swelled during the ensuing years as more and more Protestants and Jews became convinced that the abode of Jehovah/Yahweh lay somewhere beyond the orbit of Mars.

The pilgrim had not been a neat housekeeper. Ration cans were scattered everywhere, the lighter ones floating about the room. The deck was littered with them. They covered every square inch of the

stove—one was even lying on the bunk. Starmaster was not surprised. In his opinion all pilgrims had been dirty housekeepers to begin with—dirty housekeepers of the mind.

He took the ship's log with him so that when he got back to Earth he could turn it in to the Space Authority, along with the portfolio. Then he made his way over the maze of rills and returned to his own ship.

Thus far the hand's topography had touched only the borderline of his attention. Now, as he walked beneath the stars farther inland, he became uncomfortably aware of the finger crags towering awesomely before him, of the enormous thumb ridge looming in the north, of the flesh-hued slope of the cwm as it rose to meet the unreal line of the horizon. Perversely he likened himself to a mite crawling slowly across the palm of a human hand, oblivious that it was sentient and could at any moment close into a fist. Had the crag fingers risen higher into the sky? Had the thumb ridge shifted? Was the palm twitching beneath his feet?

He forced his thoughts back into their proper grooves. He was no mite—he was a man. And this was no hand—it was a chunk of rock. A chunk of rock wheeling senselessly around the sun, as dead as Mars, as cold as the moon and as frozen as Pluto.

Upon regaining the mule, he inflated the dome tent. Its mouth sealed itself around the outer cargo lock and its base sphinctered to provide air tight access to the surface. When he opened the inner lock, the mule's warmth and atmosphere became the dome tent's, too.

The matter-detector screen had showed the lode's exact location, and it had been a simple matter for him to spot the mule on a site slightly west of where the vein began and where the first of the five charges had to be placed. This put his present location a half mile east of the base of the little finger and a similar distance from the edge of the palm. The lode followed a fairly straight course beneath the southern slope of the cwm, at an average depth of four hundred feet. To separate it, he would have to take most of the outer section of the palm with it. When the section broke free he would latch onto it with the mule's attractor beams and tow it to the orbital refineries of Earth.

After opening the inner cargo lock he pulled the drill rig down the ramp and set it up over the sphincter. The low grav made the task child's play but necessitated

the sinking of extra anchors. He had already analyzed the hand's geological composition, computed its mass, estimated the temperature effect. Synthesizing the three factors, he concluded that the charges would have to be placed at a depth of seventy-one feet.

FEW Belt combers were loners. They could not afford to be. They were self-sufficient in some fields—in others, they walked by night. Generally it required three or four to isolate a lode section and tow it back to Earth.

Starmaster was a true loner. He had seen the Light at an early age, and the Light was this: A man comes into the world alone and he leaves it alone—his friends accompany him as far as the grave, but they do not accompany him into the grave. They are utterly incapable of alleviating his ultimate aloneness. Of what use, then, are friends? Are they not parasites riding upon a man's shoulders as he walks through life? If he is wise he will learn to do everything they can do so there will be no need for him to carry them.

And when all is said and done, of what use to a man is a family? Is it not as incapable as his friends of alleviating his ultimate aloneness?

No one rode upon Starmaster's shoulders—no man, no woman, no child. There was little he could not do, little he did not know. He towered high above his fellow men, a loner.

He picked up the big drill and threaded it into the brace. He had just finished tightening it when the RHO-ixviii storm struck.

It caught him off-guard because: (1) he had been preoccupied with his task, (2) the dome tent was a cheap one and lacked transparency, and (3) RHO storms were created by the conflicting pulls of Jupiter's moons and seldom traveled as far sunward as the Belt.

An RHO storm can best be likened to a giantess's skirt covered with polychromatic polka-dots. It descends upon planet or planetoid and swirls across the surface, its radiation killing every living creature in its path. Starmaster was the only living creature on the hand. His spacesuit, which would have afforded him some protection, was in the mule. When he saw the hem of the skirt penetrate the walls of the tent, he dropped the wrench he had been using. He scurried around the deadly dots and leaped through the outer lock. Air was already escaping, and the suction proved almost too powerful for the lock motors to cope with—but at last they won and the lock dogged itself shut.

Starmaster leaned against it,

basking in the warmth of relief. But a second ordeal lay in store. Unlike the RHO storm, the black moment did not catch him unaware. He had experienced it before and had grown sensitive to its approach.

When his eyes closed of their own accord he braced himself against the lock—and the lock dispersed and the deck dissolved beneath his feet and he found himself in blackness. No, not quite blackness. Scattered around him in the vast distances were pale patches of light, some elliptic, some circular, some with spiral arms. Island universes. Slowly, as though he were a little star, he began to revolve.

He knew where he was. He was in his own mind. But what was he doing there? Why had he conjured up the local group of galaxies and positioned himself in deep space an equidistance from each galaxy?

As he rotated on his axis he identified the various Messier and NGC objects surrounding him: NGC 404, the Magellanic Clouds and NGC 598, the vast swirl of the Milky Way with its garden of globular clusters, Great Andromeda and her stardust moons. NGC 404 again, the Lesser Magellanic Cloud. . .

Gradually he became aware of the awesome cold, of the abysmal emptiness. When both became unendurable, the black moment passed.

SHAKEN, Starmaster climbed the companionway to the bridge. Through the transparent bulkheads he watched the RHO storm as it moved across the hand. If you looked hard enough you could see the giantess—tall, black, Brobdingnagian, polka-dot skirt swirling as she danced over the rills and among the rocks, up one finger crag and down the next, over the ridge of the thumb. Before she was done she might return the way she had come and dance through the dome tent once again. There was no telling how soon she would tire of her lonely rigadoon and dance off into space.

It was an opportune time for him to get some sleep. But he knew he could not sleep—that he would not be able to relax until the job was done and the lode section safely in tow. So to kill time he retired to his cabin with the pilgrim's log and propped himself up on his bunk pillows.

The script was spidery yet easy to read. The pilgrim ascribed the crash to "pilot error occasioned by a Manual Epiphany." Logical enough. If an atheist could see God's hand in a chunk of rock, a pilgrim would be overwhelmed by

such a phenomenon and bound to make a mistake.

Starmaster read bits and pieces of further entries. The pilgrim in his search for God had journeyed far and wide, and at last he had been no longer alone. "God comforts me during my final days in this world." He had not found it odd that only God's right hand should be visible. "There are dimensions and dimensions beyond the picayune trio man is imprisoned in and the fourth, which he theorizes. God dwells in all of them, and only by obtaining omnidimensions himself could a mere mortal ever perceive Him in His entirety." He thought often of his fellow pilgrims and wished he might apprise them of the "Manual Epiphany" that had brought him "out of night and into day," but his radio had been damaged in the crash and he had been incapable of repairing it.

The entries became incoherent toward the end, although some of the lines possessed a poetic if not a realistic clarity of thought. "For what is a man if there is no God? Is he not one with the flotsam and jetsam of space?" "Pity the self-made gods, for they who have need of Him the most shall never see Him." "My journey has been a long one, but it has not been in vain." "His touch is gentle—it drives away my pain. It expunges my despair . . . the stars are His eyes—their light is His eternal gaze."

Skirt swirling, the black giantess danced off into space and disappeared. Starmaster donned his spacesuit and went back outside.

THE dome tent was irreparable but the rig was undamaged. He plugged the DDX cable into the mule's powerpack by means of a hull receptacle. Then he threw the switch and watched the big pulley raise the drill for the first drop. At the extremity of the lift, the pulley activated the minirocket engine in the brace. The engine fired a single noiseless burst that sent brace and drill plummeting to the surface. Cable trailing, the drill plunged into the rock. Promptly the pulley retracted it, and repeated the operation.

Starmaster had set the depth gauge for seventy-one feet. When the drill reached that depth the rig would shut itself off. He readied the first charge. It consisted of a manganese-bronze cylinder prefilled with neodynamite. Working awkwardly in his heavy gloves, he inserted the first sequential impulsor in a slot in the cylinder's wall. The impulsor was attuned to the

number-one activator on the mule's console panel and would respond to no other stimulus.

The job done, he sat back and looked up at the black star-flowered sky. The sun was a fiery chrysanthemum. Venus was a silvery rose. Earth was a lonely bluebell. Soon he would be back home, enjoying the riches the lode would bring him. The doranium lodes he had towed in before had been dilute compared to this one, but even they had netted him excellent profits. This one's potential profit made his head swim.

The rig shut itself off and the pulley retracted the drill. He carried the cylinder over to the shaft and dropped it down into the darkness. It did not fall fast, but eventually it would reach bottom.

The axial rotation of the hand had brought the fingers higher into the sky and, with their approach toward the sun, a lake of black shadows began to take shape at their base. Starmaster partially dismantled the rig and lashed it to the hull of the mule, utilizing the cargo rings provided for the purpose. Then he lifted the mule to five hundred feet and walked it on its retros to the next charge site. The black lake receded into the distance, and he brought the mule back down and went out into the sunlight.

He was unlashing the rig when the Hell Wind hit.

It slammed him against the hull and raised the interior temperature of his suit to a blistering 131° Fahrenheit. His fingers found a pair of cargo rings and clamped around them. He wound his legs about the nearby drill. Furious, the Wind upped its momentum, raising the interior temperature of his suit still higher, flattening him against the hull. He felt the drill move and for a moment feared that the rig would be torn from its lashings, he along with it, to go tumbling across the surface of the hand and out into space. But the lashings somehow held.

Even in his agony he could not help wondering how the Wind had reached so far outward from the sun. Such winds, born deep in the solar vortices known as sunspots, blasted Mercury's dayside, penetrated Venus's gown, and had been known to touch the atmosphere of Earth. But this was the Belt and the Belt was beyond Mars. Only a hyper-holocaust could have lived so long in the cold caverns of space.

He felt it diminish in intensity, but he did not relax his grip on the rings or loosen his legs from their scissors-hold on the drill. He did not trust the Wind any more than he had trusted the giantess in the

polka-dot skirt. His body blazed. He thought his veins would burst.

And then the pressure vanished altogether and he knew the Wind had departed and that it would not come back. He pried his fingers free from the rings, forced his legs from around the drill and sagged to the ground. After a while the interior temperature of his suit returned to normal. He realized that he was trembling and knew that he needed a drink.

AFTER inspecting the rig and finding it undamaged he entered the mule, unsuited and climbed the companionway to his cabin. He poured a drinking glass nearly full of bourbon and raised it to his lips. The first swallow exploded in his stomach and sent shockwaves all the way to his fingers and toes. However, not until the glass was empty did he attain the lucid interval that precedes alcoholic deterioration of the thought processes and become able to analyze his situation objectively.

(1) The fact that RHO-ixviii storms seldom traveled as far sunward as the Belt did not necessarily call into question the appearance of the giantess in the polka-dot skirt.

(2) The fact that Hell Winds had never been known to reach beyond the orbit of Earth did not necessarily imply that one of them could not.

(3) The nearly coincidental appearance of two such phenomena involved astronomical odds—but, given eternity, such odds were not insuperable and the cosmic racing form was both big enough and broad enough to admit them.

Conclusion: Neither the RHO storm nor the Hell Wind nor their juxtaposition in space and time could be credited to an attempt on the part of some cosmic force—or, to call a spade a spade, a supreme being—to thwart the rape of the hand.

STARMASTER drank three thermocups of coffee, resuited and went back outside. The fingers were almost touching the sun and the black lake had spread into the cwm of the palm, inundating the pilgrimship. He set up the rig and got it going on the second shaft. By the time he finished placing the second charge, the fingers had obscured the sun and the waters of the black lake were lapping against the feet of the rig.

He relashed the rig to the hull, lifted the mule and saw the sun again. He had made a metal map of the hand and put an *X* where each charge had to be placed. The third *X* was on the floor of a rill. He drilled the shaft, impulsified the

third cylinder, dropped it down into the darkness and went on to site number four. He was near the eastern slope of the cwm now and in the distance he could see the passlike depression that separated the thumb mound from the outer palm.

He made good time placing the fourth charge—even so, the waters of the black lake reached the rig before he finished. They filled almost the entire cwm now and the fingers wore gloves blacker than space. He went on to the fifth and final site. It was high on the slope of the outer palm, but the surface was reasonably level and he had no great trouble setting up the rig. When the shaft was finished he impulsified the fifth cylinder, dropped it and stepped back from the rig. Except for the interruptions occasioned by the RHO storm and the Hell Wind, the operation had come off smoothly. The charges were perfectly placed and the lode section could not fail to break free when the impulsors were activated. It was as good as in his pocket.

He waited to savor the self-satisfaction that was rightfully his. Oddly, it did not materialize. He felt strangely depressed.

He ascribed the first tremor to a temporary loss of equilibrium. The second sent him staggering backward. The third opened a long five-foot-wide fissure beneath one leg of the rig, causing the big machine to topple. As it fell it twisted clockwise, and the drill swung around in a wide arc. Starmaster saw it coming and had plenty of time to get out of its way, but he could not move. He was stunned. The likelihood of tectonic activity had been so slight he had not even included it in his calculations. The drill struck him in the chest and sent him tumbling down into the cwm. He came finally to rest on his back, and the waters of the black lake closed over him.

HE WAS unconscious for a subjective second. Objectively, an hour went by.

During that second/hour, he experienced the black moment once again.

He hovered like a tiny star amid the immensities and watched the majestic march of the island universes across space-time. Once again he grew acquainted with the awesome cold and the abysmal emptiness of intergalactic space. When both became unendurable the moment passed.

What frightening fact was his sub-conscious trying to get across to him?

THERE was a heaviness in his chest, but he could breathe.

He sat up, came laboriously to his feet. The black lake overflowed the cwm now - in the distance, the fingers rose up like the towers of a huge black castle. A hundred feet up the slope, next to the ruined rig, stood the mule. He stumbled up the incline and let himself through the locks. Apparently the hand-quake had done no damage. After climbing the companionway to the bridge he ran a quick test on all systems. Everything checked out perfectly.

Pain, absent until now, began in his chest and spread throughout his thorax. A brief but thorough palpation informed him that at least two of his ribs were cracked and that his right collar-bone was broken. It was imperative, therefore, that he separate the lode section and leave for Earth at once.

He extended his fingers toward the controls, but he did not touch them. He could not. He had been able to rationalize the RHO storm and the Hell Wind and he had even succeeded in rationalizing their juxtaposition in space and time. But the quake was something else. Granted, the shafts he had sunk might have precipitated it---but when you added the quake to the storm and the Wind, you got an astronomical set of odds that even the cosmic racing-form would not accept.

Before he returned to Earth he had to free himself from the terrible doubt those odds gave rise to. The intellectual universe he lived in had no room for a supreme being. For the sake of his peace of mind, for the sake of his future, he had to prove to his own satisfaction that the asteroid was not God's right hand and that therefore God did not exist.

There was only one way for him to do so.

Lifting the mule, he began walking it along the edge of the fissure. He estimated the distance carefully, then brought the mule down and descended to the cargo compartment. There he impulsified a sixth cylinder. Then he let himself through the locks and dropped the cylinder into the fissure.

Reentering the mule, he lifted it again, walked it a similar distance and repeated the procedure.

The fissure was erratic. It extended in the direction of the thumb ridge for a while, then veered sharply westward toward the fingers. Again, it veered, this time to the south, and zigzagged partway across the palm. Finally it veered to the west again as though the hand, in trying to kill him, had paved the way for its own destruction. Altogether he dropped nine charges, the last one near the base of the monolithic third finger, a

little way from where the fissure came to an end.

His pain was unendurable by this time; every breath he took made it more so. He could barely raise his right arm, and his legs were heavy with fatigue. But his determination to prove that God did not exist exalted him and gave him strength. Once again in the mule, he closed the locks, unsuited, climbed the companionway to the bridge and stood before the console.

He lifted the mule straight up, watched the hand diminish in the floorscope. When it shrank to human size he put the mule in orbit. Then he depressed the first five activators.

He saw the hand tremble. Then he saw the crescent-shaped lode section part ponderously from the palm. Immediately he seized it with the attractors and began pulling it toward the mule. When it was within five hundred feet he neutralized the attractors, locking it in tow position.

His knees were trembling. His mouth felt dry as dust. He activated impulsors ten and fourteen. There was no immediate reaction —then, suddenly, the hand shuddered and the third finger broke away. Grimly he activated eight and eleven. Again, no immediate reaction—then a shudder more profound than before. He gaped.

Awesomely, the remnant of the hand broke in two. He depressed the remaining activators in swift succession and the two major sections of the hand shattered into rubble. Only the thumb and third finger remained intact. The third finger had already drifted off into space and presently the rubble began rotating around the thumb. Light from the faraway sun shone on the little universe, bequeathing day to the picayune planets Starmaster had created.

DEFIANTLY he raised his eyes to the heavens and waited for God's left hand to appear and smite him from the sky.

He waited and he waited. After a while he realized that he had sunk to his quaking knees and was praying for it to appear—and suddenly he knew that what he had done, he had done not to prove there was no God, but to prove there was.

All he saw was the vast, indifferent face of space.

After an eternity he climbed numbly to his feet, threw the mule into full drive and began the journey back to Earth. He would never know the black moment again, but he would never know peace either . . . Back to Earth, to walk once more among his fellow men aloof, unfettered—and alone. ★

No doubt there are probability worlds where James White is e doctor, an ex-fighter pilot or a science-fiction illustrator . . .

From an early age Jim wanted to be a doctor, but for pressing reasons—he had to go to work—could not complete his education. Bitterly disappointed, he joined the Air Training Corps with the intention of becoming a fighter pilot. But when ha was about to enter the RAF, fate struck him a vicious double blow. First, the war ended. Second, he contracted diabetes, preventing him from passing the RAF medical in any case.

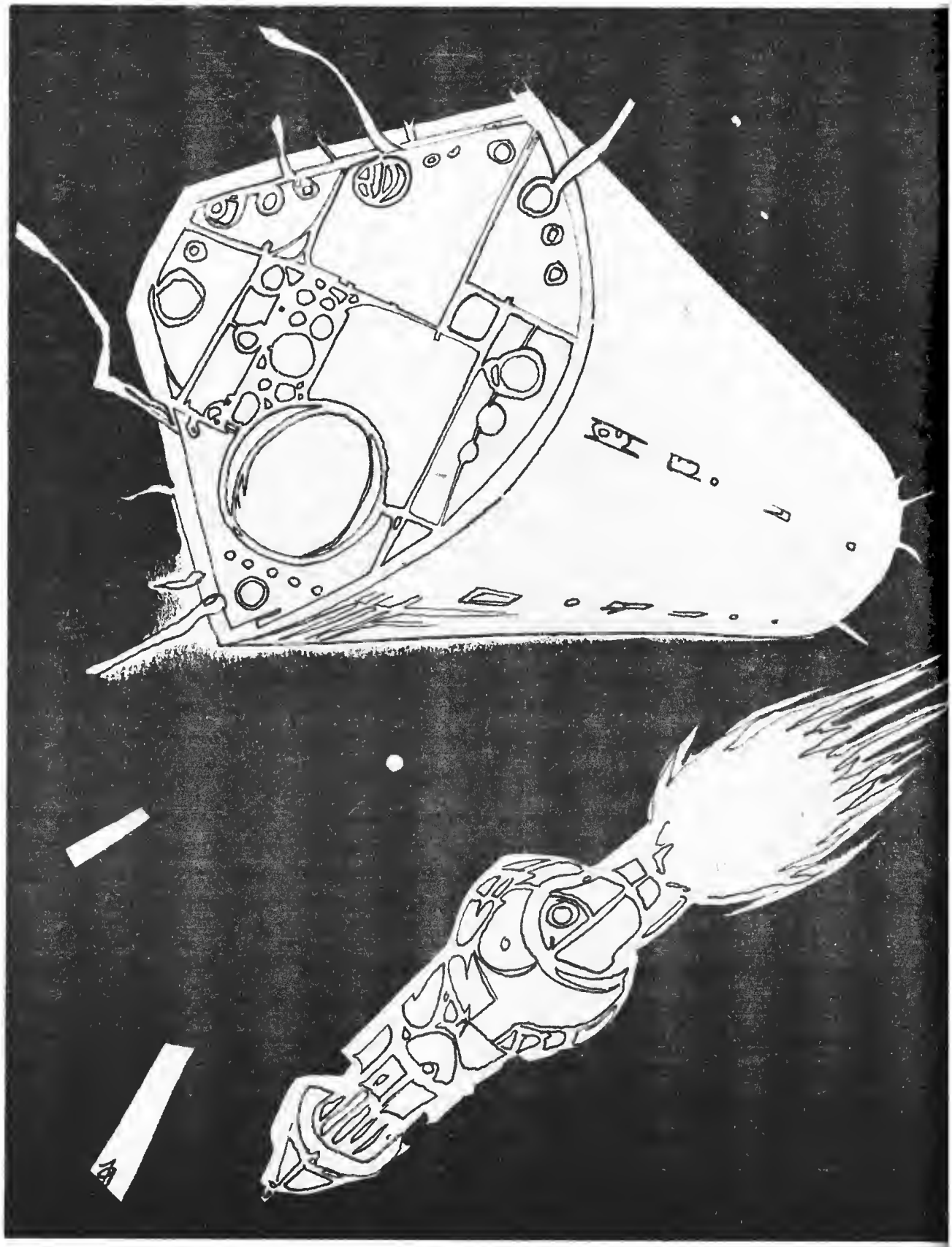
His two great embitions dashed, Jim began frittering away his twenties on hobbies like photography, ballroom dancing, painting and—unable to rid himself of the urge to practica medicine—first-aid and home nursing studies with the local Red Cross. But onca egain fate went against him and he was forced to resign from even the amateur, part-time pursuit of the medical arts. During a session on the bathing of babies, while he was practicing, with his fellow students—most of whom were girls—the head of the full-size doll he was using ceme off.

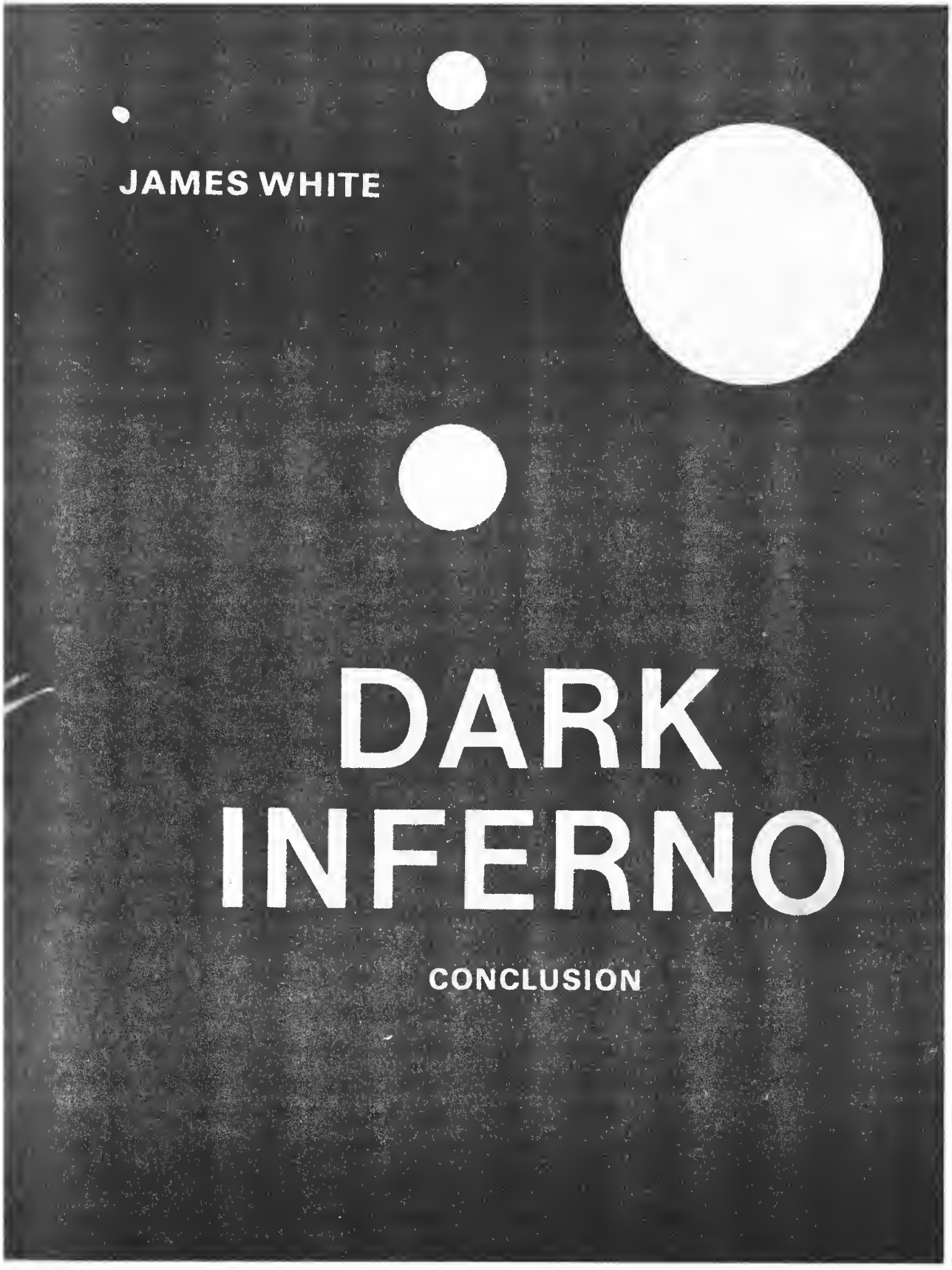
Like many s-f writers, Jim started his career in fandom—but not as a fannish columnist or the like. He went in for the pictorial side. As art editor of that well-known Irish fenzine *Slant*, he wes all set to emulate his s-f illustrator heroes Hubert Rogers and Gerard Quinn when eye trouble caused the White school of wood and linocut illustreting to close, due to a strike of the pupils. (Pun intended.) So he turned to authorship. Between fannish writings he produced his first professional story, written as a protest against all the etomic doom tales then current—it had a happy ending. John Carnell, then editor of *New Worlds* and now Europe's leading s-f agent and anthologist, bought it and asked for more.

That was in 1951. But not until 1957 and many stories later did Jim write his first Sector General yarn, launching the famed s-f medical series that has run to three book-length collections. This series, with its waird and wonderful collection of e-t doctors and patients, owes its origin both to his interest in madicine and to E. E. Smith, whose novel "Gray Lensman" first hooked Jim on s-f. It was Smith's traatment of Worsel and Tregonsee and the other visually horrifying e-ts that first showed Jim aliens could ba sympathetic characters.

Toward critics of his work Jim's attituda is flexible. Those who like his stuff, he says, show rare qualities of sensitivity and intelligence while thosa who don't, don't—but he does tend to get irritated whan they make factual mistakes by calling him English or Scottish. It isn't that he is intolerant of the other tribes who inhabit the United Kingdom with him. Some of his best friands wear stiff upper lips or kilts, and he honestly wouldn't mind if his daughter married one. But he is a six-foot-three Irishman and wishes critics should get that much right, at least.

Jim is married to e chorus girl—his wife Peggy sings with the local operatic society. She is also active in Gilbert and Sullivan fandom, gives Jim initial critiques on his first drafts and provides other fringe benefits. For the past five years he has bean a publicist for the local aircreft company, Shorts—and if he is not airborne as often as a fighter pilot, he does get plenty of chances to fly and is even allowed to steer sometimes. A suspiciously large number of his protagonists are doctors, which meens that he can experience all the drama of medicine without actually risking anyone's lifa. And, he has now found, painting word pictures gives him much more setisfaction than fooling with the other kind. So, one way or another, his ambitions are being realized, and he thinks that this is probably the best of all probability worlds.




JAMES WHITE
DARK INFERNO
CONCLUSION

WHAT HAS GONE BEFORE

This is the account of the first major accident to a passenger-carrying spaceship. The ship was Eurydice, *crewed by Captain COLLINGWOOD, First Officer PRESCOTT, Engineer NEILSON, Communications Officer MACARDLE and Medical Officer MERCER, and carrying forty-three passengers to Ganymede in the Jovian system.*

The launch was outwardly uneventful. Eurydice *lifted into Earth orbit, completed her scheduled two swings around the home planet, successfully dropped off her boosters to complement Orbital Space Station Three, as planned, and accelerated into Jovian orbit. Passengers were made comfortable, introduced to weightlessness, given survival training, drilled in the use of life pods*—Eurydice's *equivalents of an ocean-going vessel's lifeboats.*

First Officer PRESCOTT, however, felt he had detected a malfunction in the ship's engines during liftoff and subsequent course corrections and acceleration. His misgivings caused COLLINGWOOD and NEILSON to investigate and the trouble was traced to an oversized actuator rod installed during assembly. COLLINGWOOD was seriously enough injured in the course of the investigation to be incapacitated for the rest of the trip—he was subjected to intense radiation and blinded; he received an arm wound; radioactive matter entered his lungs. The ship's nuclear reaction mass also began to overheat dangerously.

The decision was made to abort the voyage and return to Space Station Three for repairs to both the ship and her captain.

IX

"*EURYDICE* CONTROL. Do you read?"

Mercer had his ears on the captain's respiration and his eyes on the passenger-vision pickup, which showed a fair amount of socializing going on in the module and two couples dancing—mixed all-in wrestling might have been a better description—in the weightless section forward of the tank. He did not pay much attention to the exchanges between Prescott and *Eurydice* ground control—they were too technical for him in any case—until the acid tones of the first officer became noticeably more caustic.

". . . a combination of minor oversights, none of which would have been individually troublesome," Prescott was saying. "Next thing you'll tell me that they could have happened to anybody."

"The man will be fired, of course, with the others who missed his slip-up. But it was basically a clerical error and he was under stress at the time. A domestic problem was worrying him, his wife was expecting their first—"

"I hope," said Prescott savagely, "that she bore him a litter of lizards. But I'm more concerned with effects right now. Just as soon as possible we shall apply full thrust. But first, before we swap ends to decelerate, I must know if the nuclear propulsion system is safe. The accident knocked out most

of our sensory circuits in that area and, although the remaining instrumentation gives a confused but not exactly dangerous picture, I'm worried about that slight rise in temperature reported in the water tank."

"I'm not questioning your decisions, Prescott, but aren't you over-reacting to all this? The chances are that you will have no further trouble and that the damage is easily repairable. Maybe the captain's condition is not quite as serious as you think and in the heat of the moment Mercer may have mistaken the temperature of the tank water and --"

"Unlikely," said Prescott. "There have been a few hot moments since and he hasn't- "

"Very well, Prescott, carry out your abort. We'll allow you half an hour to swap ends—no point in wasting time if you are set on doing it—and give you the numbers for full deceleration and insertion into the return orbit. Do you still want the recovery ship team on standby?"

"Don't ask stupid questions."

"Very well. *Eurydice* control out."

Prescott took a deep breath and turned to Mercer. "You may have thought that I was about to compliment you back there. Don't set too much store by that—I just can't abide outsiders criticizing one of the family, even a new, untrained, foundling member like you.

"But I've a job for you," he went on. "Go back and recheck the tank temperature. You'll find insulated bottles in the bulkhead locker beside the outer seal. Take one. You will see that it has a snap fastening at the neck, that it is double-walled and that there is a thermometer with a yellow disk, which changes color in certain circumstances, between the walls. Go into the lock chamber—no need to go into the tank itself until we have some idea of how much radioactive contamination you left behind after your first bath. Open one of the inner valves—they are plainly labeled with operating instructions. Press the neck of your bottle against the outlet and keep it there until it is nearly full. In free fall the water will not pour out so you may have to wait for a few minutes for it to fill -"

"I should do this," said Neilson suddenly. "After all, I'm still dressed for the job."

"Don't think I haven't noticed," said Prescott sourly. "Pull up your shorts, damn it. I have enough problems on this ship without having my sensibilities blasted by the sight of your hairy navel. And I don't want you or your eyes to leave that board. MacArdle will monitor the captain's breathing and watch your board, Mercer, so move."

Since he would not have to go into the tank itself Mercer did not bother to change. He put on a purposeful expression and pretended not to notice the passengers who spoke to him on the way. The weightless dancers were not noticing anyone but each other. He found an insulated bottle and entered the chamber quickly, pressed the bottle's mouth against the outlet and began turning the valve.

The metal felt very warm.

Suddenly the bottle thumped against the palm of his hand. He stared at it stupidly, realizing that it was already full and that it should not have filled so quickly. As he withdrew and sealed the bottle, steam and scalding gobbets of water spurted from the outlet, filling the chamber with a hot, blinding fog. Mercer let go of the bottle, wrapped his hand in his cap and twisted shut the outlet valve while with his other hand he groped for the evacuation button. He heard the combination suction pump and air blower—the only means of rapidly emptying a compartment full of weightless water—making rude, gurgling sounds.

But the chamber did not clear completely—steam and a fine spray of scalding droplets were spurting from the edges of the inner seal. Mercer retrieved his cap and test bottle, whose thermometer showed a temperature close to boiling point—the disk Prescott had mentioned had turned from yellow to muddy brown. Mercer felt like a half-boiled lobster with an icy cold lump of fear in its belly. Even though he did not know what exactly was happening, he did know that it was deadly serious and that he had to get back to Prescott fast.

THE passengers outside had other ideas, however. As soon as he came out they surrounded him, laughing and trying to grab him.

"There's a black crow among the lovebirds," said one of the men. "A wet, black crow."

"That isn't fair," said one of the girls. "You promised us a swim and now you've had two and—"

"With your *clothes* on!" added another girl who had succeeded in grabbing his ankle.

He wanted to yell at her to let go or he would kick her pretty, laughing face, that he had no time for horseplay at a time like this. But instead he said, "No ma'am, space-washing. I dump my wet uniform into a lock, open it to space and the moisture boils off. It takes out the wrinkles, too. Excuse me—I mustn't catch cold—"

When he entered the control room a few minutes later Prescott, one hand gripping the engineer's headrest, was hovering over Neilson's board. He said, "Mercer, you do *not* launder your uniform in that incredible fashion, unless you don't mind ice crystals in your underpants—and your ability to lie convincingly under pressure worries me—"

He broke off as he saw Mercer's face, then put out his free hand for the bottle.

"It's hot," said Mercer.

Prescott's features went stiff. "In both senses of the word." He handed it to Neilson. "Well?"

The engineer took one look, then said very calmly, "This damn board is half dead and the rest of it is sick. Getting no response at all from the sensors usually means a complete power cut-off or a simple circuit failure. This tells me that what we have is circuit failure—probably the cable looms are melted through and the amount of heat conducted through the stern to the tank tells me that we have a reactor meltdown situation. At the moment the

dampers are in just far enough to give power for lighting and life-support, but they aren't locked and now I can't lock them. When the rod actuators melt they will pop out and the reactor will go critical."

"Have you enough power," said Prescott, "to engage with the passenger module?"

Neilson nodded.

"Then do so."

Prescott swung himself into his couch as the control room began gradually to share the spin and apparent gravity of the passenger section. He unclipped the public address mike, paused for a moment, then said calmly, "Attention, ladies and gentlemen. Please stand clear of the survival pod hatches. They will open in five seconds. This is not a drill. We are preparing to abandon ship."

The words sounded frighteningly final. Too much was happening too quickly and Mercer desperately wanted to go back in time, if only for a few minutes, to give himself a chance to assimilate the present. Inanely he said, "When I was in the tank chamber the inner seal looked as if it might—"

There was a loud thump and the edge of the door he was gripping jerked under his hand. On the passenger viewscreen he could see steam filling the passage leading to the tank.

"It just has," said Prescott. "But the outer seal is much stronger and should hold for a while. See what you can do for your passengers."

Mercer had trouble negotiating the normally weightless corridor to the passenger compartment because the gravity-free forward and stern sections were now sharing the rotation of the central module. This was necessary if the four big, widely curving supports—which carried the power and control links fore and aft and allowed the passenger section to rotate independently of the rest of the ship—were not to snag the life pods on their way out. The effect on Mercer was that his feet were pulling one-eighth G while his head and chest were weightless and coriolus force was giving him an extra twist just for luck. But Prescott was not allowing time for anyone to think, much less feel confused.

"Attention, ladies and gentlemen. The survival pod hatches are now open. Please board three to a pod in a brisk but orderly manner, just as you did during the drill. The hatches will be sealed prior to pod ejection in five minutes."

MERCER was in the passenger section by then, furiously running over in his head the emergency instructions he had memorized only hours earlier.

He called loudly, "Don't forget to leave behind all personal effects that are metal or have sharp edges—manicure scissors, jewelry with large stones or anything that might puncture the fabric of the survival pod. Don't worry about losing them—you will be fully compensated for their actual or sentimental value."

The last was a stupid thing to say at a time like this, thought Mercer. The words simply popped out. He could imagine what Prescott would have to say about them. Unless, of course, his subconscious had been

working and had decided that appearing to worry over trifles at a time when all hell was breaking loose was also an effective means of giving reassurance.

But suddenly all subtle methods of reassurance became superfluous as the outer seal of the tank began to give. Steam billowed into the passenger module, cutting visibility to a few yards, while a high-pitched whistle made hearing just as difficult. Mercer leaned toward the nearest couch mike.

"Control, give me maximum lighting, please."

Someone screamed, probably thinking that there had been an explosion, as the lights went up to full strength. As a result the passengers who had been standing around, too stunned by events to move, began piling into the pods. The process was not orderly but it was fast. Mercer stumbled over three persons trying to get into a pod at the same time. He dragged two of them back—no effort under quarter-G conditions—and fed them in at five-second intervals. A few yards farther a woman was rolling up the cabin dividers.

"We won't be using them again, ma'am," Mercer shouted. "Get into your pod."

He continued from pod to pod, not wasting time on words when a good hard push would serve instead, but usually finding that the heads and shoulders were disappearing with satisfactory rapidity.

"Anyone who hasn't found a place?" he called. "Speak up, please."

"Bobby! Where's Bobby--"

He glimpsed a moving shape in the fog and went after it. The extra lighting was making the thickening clouds of steam more dazzlingly opaque now and was not helping visibility at all. He gripped Mrs. Mathewson by the arm and pulled her toward the nearest hatch.

"Have you room for one more?"

"No—full up," replied a voice from inside.

Mercer swore, not believing it. Still gripping Mrs. Mathewson, he kneeled and reached into the pod with his free hand. He felt the tops of four heads. The pod certainly was full.

"Mercer, hurry."

He ignored Prescott's voice in the earpiece and that of the distraught girl on the other side as he moved to the next pod and repeated the question. The white blur of a face appeared, then a pair of hands.

"Listen, ma'am," he shouted as gently as he could, "Bobby is safe. People feel protective toward children and he was probably first into someone's pod minutes ago. So just--no, let go of my neck. He'll be all right, I promise you—"

He was holding her by the armpits over the open pod and a pair of hands were trying to pull her in. Suddenly he kissed her steam- and tear-streaked face. She was so startled that she lost her grip on his neck and disappeared into the pod.

I've been doing a lot of things without thinking today, he thought, *and they've all seemed to turn out right. . .*

But just then he badly wanted to dive into the nearest pod, kick and claw his way to the bottom—no

matter how many other people were in it—and wait until Prescott flung them clear. The whistle of escaping steam had taken on a deeper, burbling tone that probably meant that the seal was ready to give and that a major explosion would come at any moment. And as he moved from pod to pod, shouting for anyone who had not found a place to call out, he found himself splashing through a half-inch of nearly boiling water.

The hatch lips were only an inch above deck level. The fog was unpleasantly hot and it was difficult to breathe.

He filled his lungs carefully, cupped his hands around his mouth and shouted, "Is everyone aboard the pods?"

From somewhere in the fog a voice called shrilly, then began to cough. Mercer headed for the sound until a short gray ghost loomed out of the dazzling mist.

It said tearfully, "I'm looking for my mother."

Mercer grabbed the boy by the waist and splashed toward the nearest open hatch. There he turned him upside down and said very clearly, "Your mother is safe, but her pod is overcrowded so you'll have to take this one. Wriggle your way to the bottom as fast as you can—there isn't much time and nobody will object when they see who you are. You'll probably have to take charge of this lifeboat, Mathewson. Good luck and in you go."

"Room for a small one," he called into the pod. There was no reply, but then he had not really been asking a question.

When Bobby's heels disappeared Mercer turned so that his back was to the sound of the monstrous steam whistle astern, the only means of getting his bearings because his eyes were closed. He held his cap over his nose and mouth to make breathing a little easier. When he stumbled against a couch he remembered something and bent down.

"Prescott, they're all aboard."

"Return to control."

The passage leading to the control room was slightly cooler—he did not need his cap to breathe through and he could even see a short distance, specifically to a recessed basket marked Crew Laundry with a couple of rolled-up coveralls inside. He took one set as he passed.

The whistle from the stern was becoming louder and deeper, but it was not as loud as the clang of the survival pod hatches going down.

X

"CLOSE the door and take your couch," said Prescott. "We won't be going anywhere for a few minutes."

Nobody seemed to be doing anything except waiting. Mercer did as he was told and watched the steam that had come in with him being shredded and sucked in by the air-conditioning. The control room was so quiet that he could hear even the captain's breathing. The silence was frightening, giving Mercer no chance to do anything but think.

"Neilson," he said suddenly, tossing the soiled coveralls toward the engineer, "it's hot out."

"Bless you," said Neilson. "With my fair Nordic complexion I boil easy." He looked inquiringly at Prescott.

The first officer nodded. "Put them on. And shut up, both of you."

Outside came in.

"*Eurydice* Control. We have a suggestion here that you retain your passengers and dump the sick reactor. Venting the tank astern should nudge it away from you and you will have a fairly comfortable ship to live in until the recovery vessel reaches you."

Prescott looked at Neilson, who turned down the corners of his mouth.

"*Eurydice.* We have already looked at that idea. Negative. We have virtually no control of any stern system other than the tank emergency vent." Prescott leaned toward his board, paused, then went on, "We are releasing the survival pods—now. Time is sixteen-oh-five plus fifteen seconds, launch zone."

"We copy, *Eurydice.*"

Mercer twisted around to the direct-vision port. He could see five deflated pods tumbling away from the ship, looking like stubs of discarded cigarettes. They were falling away at eight feet per second, the velocity imparted by the passenger module's centrifugal force of one-quarter G. But they shared *Eurydice's* forward velocity so that they kept pace with the ship, merely spreading out like a ring of receding moons.

Suddenly they appeared to swell and come nearer, but it was only an illusion created by their plastic canopies pressurized to full size. Still receding, they began to slide slowly past the viewport.

The crew survival sections were much closer to the ship's axis than had been the pod housings so that, to release them with the same velocity away from the ship, *Eurydice* had to increase her spin to compensate.

"More trouble," said Neilson quietly.

Control was alert. "Go ahead, *Eurydice.*"

"The tangential jets are spinning us up to release speed, but the circuit for cutting them just died. I can't shut them down. We'll have to release exactly on the pip, twelve minutes and seven seconds from—now."

"We copy."

"Set the timers to release automatically at that time," said Prescott. "Do you still have control to the stern emergency vent?"

Neilson showed crossed fingers and said, "At the moment, yes."

"Set a timer on it to vent ten seconds after we release. Can you estimate the strength and duration of the thrust and the acceleration to terminal velocity, allowing for the absence of the crew segments, rendezvous marker and the reducing weight of water in the tank?"

"Some of the water has already vented into the passenger section," Neilson replied, "so it will stay with the ship and boil off very slowly. But I have no way of telling how much there is."

The conversation was so quiet and matter-of-fact that Mercer wanted to shout and break things. But it was quiet because the con-

trol room door was tightly closed and the mikes in the passenger section had been switched off and, apparently, calmness could be just as contagious as panic.

He found himself saying quietly, "Between the time the tank's outer seal gave way and I left the passenger section, eight minutes ago, the water had risen halfway up the rims of the survival hatches—about a half-inch. Does that help?"

"It's better than making a blind guess," said Neilson. "Let's see—we know the deck area of the passenger section and have a rough idea of the volume of water covering it, but add a little for the water content of the steam—"

"*Eurydice* Control. Please clarify. What are your immediate intentions?"

"*Eurydice,*" Prescott replied. "We are not sure if we have a pile meltdown or a bang situation. If a bang—we want to be as far away from it as possible and we also want the radioactive debris to be well clear of the pickup area when the recovery ship arrives. Since our reactor controls are out we propose venting the tank through the stern and bypassing the reactor. Structural heating is such that we should have a crude steam jet that will accelerate the ship ahead and, I hope, clear of the survivors before the bang. Neilson?"

"Roughly two feet a second, rising to three as she sheds reaction mass," said the engineer. "If the structural heating extends to the passenger module the water there will also vaporize and vent through the stern—but the additional thrust will be negligible."

"We understand, *Eurydice*. The recovery ship countdown is now at minus ninety-six hours and three minutes. It will be out there in just over five days."

"You don't understand," said Prescott sharply. "We don't need a fast rescue. Take your time and check the nuts and bolts. You cannot risk a launch until *Eurydice* has blown or is a safe distance ahead of us."

And if it went critical before then, Mercer knew, there would be no point in launching the recovery ship at all.

MACARDLE said, "Rendezvous beacon launched at sixteen twelve and eight seconds. Minimal lateral velocity—just enough to let it clear the steam jet."

"Copy."

"Timers set and checked," said Neilson.

"Beacon radiating," said MacArdle.

Prescott took a deep breath and looked quickly around the control room. He said, "We shall all feel a little safer in our cabins. Neilson and MacArdle, get going. Mercer, hold a moment."

Steam was coming from the air-conditioning grills now and when Neilson and MacArdle left, the rush of steam from the passage outside dropped the visibility in the control room to a few feet. Prescott closed the door and moved to Mercer's couch.

"We have a few minutes to spare," he said quietly, as if he had days. "Enough to answer a few

questions or to let you get anything off your chest that is bothering you."

Mercer was on the edge of his couch, his legs and arms bent and body poised for a dive toward the door. He was waiting for the fatal thump of the steam explosion aft that would blow the tank's outer seal, fill the ship with superheated vapor and trap Prescott and himself in the control room to boil in their own body juices. He wanted to kick the first officer out of the way and escape right now.

But he saw a look in Prescott's eyes that was strange in these circumstances, yet familiar. Mercer had seen it on a few occasions when one of his colleagues had become too deeply involved with the suffering of a seriously ill patient. Prescott, he realized suddenly, was worried about him. He was inviting Mercer to bawl him out with no witnesses present, hoping to relieve Mercer's fear tensions.

Mercer wanted suddenly to laugh, but he got control of himself in time to smile instead.

He said, "Permission to go to my cabin, sir?"

Prescott looked relieved. "I've been hard on you, Mercer, for two reasons. One is that you have been doing penance for the sins of your predecessor and the other is that I am hard on everybody. But now you have been dropped into it along with everyone else and there is time neither to apologize nor to tell you exactly what you should do—"

"*Eurydice* Control. We have looked at your steam jet idea. There is a strong possibility that venting your water astern will check the meltdown and delay detonation for a considerable period. Thought you would like to know."

"*Eurydice*. Thank you," said Prescott, then went on: "So you could do worse than spend the first few days in your couch, studying the emergency instructions. An extra complication is that the pods and crew segments will be spinning or tumbling slowly—because of our control failure the ship's power lines were still connected to them at the instant of release and gave them an off-center tug as they left. But don't worry about the spin, there is no hurry to correct it. Just try to calm your passengers as quickly as possible, organize your communications and give them as much help as possible. Good advice is about all you can give them, but don't forget to take some of it yourself. I'll be in touch. Let's go."

Control said, "Good luck, *Eurydice*."

Without replying Prescott slid back the door. Hot, choking fog and the blast of a gigantic steam whistle came in as Mercer and Prescott, in that order, went out.

Centrifugal force had changed his sick-bay cabin beyond all recognition, Mercer thought as he stood on the transparent canopy, gripping two nearly vertical bunks. The protective cover had already been released from his canopy and he could look down past his feet at the apparently motionless and undamaged ship and at stars whirling past like a blizzard of jewels. A faint, wavering line held its position in the starry storm—the receding survival pods thrown off minutes earlier. He should talk to

them—as soon as he discovered what he was supposed to say.

A few seconds after he had found the emergency instructions booklet he heard a series of thuds and clicks as the cabin went automatically to internal power and his feet drifted away from the transparent floor.

The stars did not rush past so quickly, but they had a twisting motion which told him that his cabin was no longer spinning evenly with the ship but was tumbling free in the wake of the passenger capsules. He caught a glimpse of another crew segment, the ship whirling past and the incandescent streak of the sun.

Mercer checked on the captain's condition, strapped himself into his couch and tried to read. Outside, the abandoned *Eurydice* was growing smaller each time it whirled past, but he could not see any sign of damage. The sun dazzled him a split-second later.

He rolled the anti-glare cover across the canopy. If the ship blew there was no point in risking being blinded by two suns.

XI

> Since only four of the five cabins used by the ship's officers double as survival modules, the medical officer and first officer will share the sick-bay segment, which is fitted with pod frequency radio even more powerful than that carried by the captain's survival segment.—*Emergency Instructions*

IF HE had not been lucky and the captain unlucky, Mercer would have had to share his segment with Prescott. As things were, the first officer was now spinning away in the captain's module.

According to the emergency instructions, the captain's module contained communications equipment that enabled it to maintain contact with ground control as well as allowing two-way contact with the other officers and, to a limited extent, with passenger pods in its vicinity. One frequency allowed its occupant to listen at any time to what was going on in the other officers' modules. Another channel allowed them to call him but not each other. The officers had a channel for speaking to the passengers—just one channel, unfortunately, so that they had to address all the pod occupants at once. Another allowed them to eavesdrop on the pods in case trouble developed among the survivors. But this was also a single channel, which meant that the officer using it would hear any and all passengers who happened to be speaking at any given time.

It was not difficult to understand why the captain had to be able to keep close tabs on his officers and a two-way line open to home—or, for that matter, why the sick-bay's radio had most of its power channeled into the pod frequency. The survivors were expected to need medical advice more than any other kind and, with the distance between the potential patients and their doctor increasing every second, advice was all he could give them.

The sooner he started giving it

the better, but he did not want to begin until he understood the problems in more depth than did the survivors and was able to give answers that would sound authoritative.

A large proportion of the manual was devoted to instructions for space officers on how to maneuver and navigate the segment and make the best use of its services and accessories. While the instructions for trained astronauts were unnecessarily technical, Mercer thought that the section dealing with passengers seemed to be aimed at people with a mental age of twelve. The medical side was barely mentioned, but the psychological problems he was told to expect seemed incredibly melodramatic. He had to remind himself that even on Earth people managed to do some dramatic things to themselves and each other. When they were spinning through eternity in a ten-foot plastic bubble, driven close to madness by fear and the utter, savage strangeness of it all, it might be easier for them to forget that they were civilized beings.

Suddenly he felt ashamed of himself for lying in his couch, reading, a solid, well-furnished structure around him and the sunlight a pulsing amber glow behind the canopy filters. He tried to compare his condition with those prevailing in the survival pods, where three or more passengers were tumbling together in a fragile plastic bubble and he could not readily imagine the total contrast. Even if some of the passengers kept their heads and tried to read the simple instructions printed at intervals on the interior of the plastic wall—the bubbles were transparent and the glare of the sun would probably make the texts impossible to see clearly until screens could be made completely operative.

He had been reading for all of twenty-two minutes, by his watch. The technical passages he could study later, but the instructions regarding the passengers should be obeyed as soon as possible. A pull-out sheet at the back of the book contained pod numbers and spaces for the names of the occupants. Mercer taped it to the bulkhead beside him and unclipped his mike.

"Your attention, ladies and gentlemen," he said slowly and distinctly. "It is less than thirty minutes since we abandoned ship. You are probably becoming accustomed to being inside a survival pod by now and are beginning to realize that the accommodation leaves a lot to be desired. However, you are absolutely safe and the spinning movement of your pods is nothing to worry about."

He paused to let this reassurance sink in.

Then: "Some of you may already have read the instructions for checking spin and have put them into effect. To those who haven't done so or who may have problems I shall be able to give instructions in due course. But first I must check that everyone got safely off the ship. Relatives and friends may have become separated and I must begin by making roll call of all survivors so that I can reassure these people. Would the occupants of Pod One please speak their names—and would everyone else

keep absolutely quiet while Pod One reports in?"

MERCER flipped up the receiver switch and discovered that all his charges were talking at the tops of their voices. He tried again.

"Ladies and gentlemen," he said sharply, "you are all speaking at once. I must insist on silence except for the occupants of Pod One."

He became more and more insistent as the minutes slipped past, but he still could not silence the voices from Pods Two through Sixteen. Twice he very nearly had it when only two pods were talking at once and he almost understood what Pod One was trying so patiently to tell him, but then everyone else seemed to sense that his or her own personal demands for assistance, advice or information had a chance of being heard and Mercer's speaker poured out only a high-pitched babble.

"All of you, be quiet! Pod One, come in, please."

"Pod One. For the fiftieth time—Mr. Wallace, Mr. Rutherford, Mr. Gunning."

"Thank you, One," said Mercer, noting the names on his sheet. "Pod Two?"

"Mrs. Wallace, Mr. Simpson, Mr. McCall. We can't get this damned thing to stop spinning and the sun is—"

"Thank you, Two," said Mercer. He relented slightly. "Each pod has one pair of anti-glare goggles in its medical pack. Try to remember the pod sequences from the instruction film and let the person with the goggles supervise. I'll come back to you as soon as the tally of passengers is complete. Pod Three?"

"Mrs. Mathewson, Mr. Stone, Mr. Kirk."

"Pod Four?"

"Mr. and Mrs. Corrie."

"Pod Five?"

"Miss Moore, Miss Sampson, Mrs. Kirk and Mr. Eglin."

Mercer made a note to check on the life-support duration of a pod with four occupants, wondering wryly if the psychological problems would turn out to be a much greater threat to the pod's safety than a possible shortage of food and air.

"Pod Six?"

The interruptions were few, and Mercer worked steadily through his checklist until he came to Pod Eleven, which did not answer. He tried again.

"Pod Eleven, come in please."

Again silence answered him.

Mercer turned up the gain on his receiver to maximum. The silence grew noisier as the sounds of breathing and body movements coming from the other pods were suddenly magnified. Someone coughed deafeningly.

From Pod Three Mrs. Mathewson screamed: "Bobby, what's happened to Bobby?"

Mercer turned down the volume quickly. He, too, had begun to wonder what had happened to the boy. It was by no means certain that Bobby was aboard Eleven. Perhaps nobody was aboard Eleven.

The ship had carried a more than adequate supply of survival pods for the number of passengers aboard. So far he had one pod with two people in it, two pods with four people on board and the rest with

three occupants, so that it was probable that in the confusion and poor visibility at least one pod had been launched empty.

"Pod Twelve, please."

While he jotted down the names of the passengers on Twelve and then Thirteen, Mercer began to worry that Eleven's radio might be faulty. Where *was* the boy?

"Pod Fourteen?"

"M—Mathewson."

Mercer wanted badly to express his relief. Then he thought about the game he had been playing with young Mathewson and all at once it seemed to be a good idea, considering what he knew of the boy's background, to go on playing it.

"Very well, Mathewson, please list the names of your crew," he said briskly and waited.

"Just—me."

Mercer wanted to say something, anything, that would reassure the boy, but he needed time to think and he did not have it. All he could do was go on playing the game and hope that Bobby would be able to go on playing it as well.

"I copy, Pod Fourteen," he said. "I will come back to you with instructions later, Mathewson. Meanwhile, you have control. Pod Fifteen?"

A few minutes later he had the names of the rest of the survivors and was preparing to check them against the passenger list. He switched off the pod frequency to allow himself to concentrate on what he was doing—with the small part of his mind that was not worrying about the Mathewson boy and his mother. During the initial exchange he had repeated the boy's name simply to let the mother know that he was safe. But now she would know that he was alone as well.

His speaker came to life. "Prescott. What progress, Mercer?"

INSTINCTIVELY he reached for the transmit switch to answer, then lowered his hand. Prescott was listening in. Mercer could do nothing about it short of tearing out the radio installation, cutting himself off from everyone else and risking damage to the other electrical systems in the module. He decided that he did not dislike the sound of Prescott's voice enough to risk any of those eventualities.

"I have completed the tally of survivors," he said, "and now I'm cross-checking against the passenger list."

"Carry on while I talk. The situation at present is that *Eurydice* is still pulling ahead of us on her teakettle drive, but slowly. Should the reactor go critical now we would have no chance of escaping. But there is a much better chance that it will simply melt into a radioactive mess and the resulting mild explosion will scatter debris and radiation over a comparatively small volume of space. This would also mean that the fuel slugs we were carrying as cargo for the Ganymede Base reactor will be scattered instead of contributing their megatonnage to the blast. Have you got that?"

"Yes," said Mercer. He added: "All the passengers made it to the pods."

"Good. I spent a few minutes

listening to your rollcall. You seem to be handling things fairly well—one reason we are minding our own business and letting you do the same. We have had to spend some time on stabilizing our segments and repositioning them so that our directional antennas will bear—mine on *Eurydice* Control, Neilson's on the ship in the hope of getting a few minutes' warning before she blows. MacArdle's antenna is on the radio beacon we dropped, which will be on low emission until the time comes for us to burn for rendezvous. I think you were unnecessarily tough on young Mathewson."

Mercer double-checked to make sure that the passengers were not receiving the conversation, but he did not reply.

"I want your reaction, Mercer."

"Sorry, I thought you were simply giving your opinion," said Mercer, not caring if he sounded insubordinate or merely angry. "Maybe I was wrong to handle it that way because I don't know very much about the boy or his mother. But I do know a little. The woman is escaping—" his tone became clinical—"whether from an event or a person I don't at the moment know. I do know that the boy's father was far gone on PCs, so perhaps he got himself killed or he suicided during a change party—or maybe he survived physically but with the original personality lost along with the ability to mentate. The woman, I would say, has never been on PCs—she was and is too worried and tense and—well—normal. The boy shows some signs of emotional disturbance, but is otherwise also normal. He has a uniform and wants to play spaceman."

"I noticed that."

"The trouble is," Mercer continued, "I have been playing the game with him by treating him—and talking to him—as if he were a junior ship's officer. Part of the game was that I did not act toward him as I acted toward the other passengers—they were asked to do things, he was told. You realize the position I'm in? If I change suddenly from being a superior officer, even a pretend superior officer, to a sentimental softie who tells him that he is a good boy and not to cry, there could be trouble. His father must have subjected him to the same kind of major personality change several times a week and the kid did not like it. The way I see it, rather than be nice sometimes and nasty at others it is better to be consistently nasty."

"I've found that myself."

"The next step," Mercer went on, "will be to help him stabilize his pod and not sound too much like a worried father while I'm doing it."

"Very well. It's your problem."

"And his," said Mercer.

XII

"QUIET, everyone. Pod Fourteen, come in, please." Mercer's voice.

Kirk, in Pod Three, hung close against the interior face of the services module, knees drawn up and elbows tight against his chest as he gripped one of the soft plastic handles projecting from it. His eyes were tightly shut despite the

anti-glare goggles he was wearing. His small, hairless head, thick neck, sloping shoulders and wide waist gave him the visual aspect, from the back, of an enormous, lumpy pear.

Close beside him Stone was holding on with one hand while the other covered his eyes. "If you're not using the damn things," he whispered, "give them to me."

At the other end of Pod Three Mrs. Mathewson also had a hand over her eyes. The other one was gripping a screen attachment point while her head was inclined toward the speaker grill. She wanted to hear what Mercer wanted to say to Bobby in Pod Fourteen. She could not, of course, hear her son.

"Please," she whispered.

"Sorry," said Stone in an even quieter whisper. "But there are people who take no notice unless you shout at the top of your voice." He tapped Kirk on the shoulder and pointed at the goggles.

Kirk let go of the plastic grip with one hand. Without warning he swung it back, hitting Stone in the chest with his closed fist and forearm and sending him spinning slowly across the pod. Then he pulled off the goggles and threw them at Stone.

Stone blundered into Mrs. Mathewson's legs and instinctively grabbed them to steady himself, with the result that they both swung into the flexible wall of the pod which gave alarmingly with their weight before bouncing them away again. For a few seconds the whole pod grew bulges and indentations until it reached dynamic equilibrium again and the spinning sun took up an even more complex motion.

Squinting against the intermittent glare, Stone fished the goggles out of the air and put them on. He looked at Kirk's back for a long time, but the tinted eyepiece made it impossible to read his expression.

Pod Fourteen had evidently answered—Mercer's voice came again over the speaker, replying to whatever Bobby Mathewson had said.

"I know it isn't. But first you must put on the goggles. You will find them clipped to the underside of the lid with a red cross on it. While you are finding them and putting them on I will explain why this is not like the demonstration film. That film showed a simple abandon-ship sequence that allowed enough time for the pods to be manned and all ship-to-pod connections severed by the ship's officers before launching. The connection that has caused our trouble was a thin cable that carried ship's power to a pod, so that it could be tested or used for survival drills without wasting its own internal power. This cable should have been cut by a remote-controlled knife, which is also, for manual operation, fitted to a handle that projects through the pod hatch cover. But there was too much steam in the passenger compartment and not enough time for me to go around pulling handles, and the circuits to the remote-controlled actuators were dead.

"When the pods were launched the cable tugged the pods sideways as they left and gave some of them a twist as well. Normally the

pods and cabin segments would not spin at all as they came free, but you have to remember that there is no real difference between starting a spin to change the attitude of your vehicle and stopping it. Just as long as you--

"No, Mathewson, not that kind of knife, but it cuts just as well. Are you ready?"

"It's too complicated," said Mrs. Mathewson.

"He's a smart boy," Stone whispered.

"Right." The whispers in Pod Three had evidently reached Mercer. "The first thing to do is to lie as flat as you can against the pod skin, the transparent section, and hold on to the molded finger grips in the plastic. Got that? Then move around until the sun seems to be coming from the top of your head, passing in front of you and then moving under your feet. Take your time, Mathewson. There's no hurry about this."

Stone stared at the sun—it was whipping over and around the pod so quickly that he could only guess at its direction of travel. He opened his mouth to speak to Mrs. Mathewson, then remembered that they were supposed to keep the frequency clear for the boy and shut it again.

Others, apparently, had forgotten.

"Quiet, everyone," Mercer said. "I lost some of that, Mathewson. Say again, please, slow and easy."

"Don't cry, Bobby," said Mrs. Mathewson softly. "Please don't cry."

"Going too fast, you say? I see. There is a trick you can try that should beat that one. Get flat against the plastic again, look outside and blink as fast as you can. That will make the sun seem to stop or at least go past in short streaks that will let you know the direction it is traveling in. Ready? Now—"

"It works, by God," breathed Stone.

"When you know the direction, get the sun to come from above your head and go down past your face and under your feet. Keep it moving like that as you start to crawl forward. When you come to the lock section or the services panel—or when you are crawling over plastic that is not transparent —try to keep your line of movement straight by looking ahead to the next transparent section to see where the sun is. Got that? Then off you go."

Stone began to crawl, trying to keep the incandescent band of the sun vertically in front of him and his body flat against the plastic. He was not very successful in doing either.

"I know. But don't try to rush it, Mathewson. Try for a steady even movement and don't worry if the sun appears to drift sideways—when you have checked the tumbling motion of your vehicle it will be easy for you to turn at right angles and check the sideways movement. But it will be a slow job because this is a solo mission for you. If you had more people on board they could cooperate, space themselves at intervals around the inside of the pod and crawl in the same direction—or hold on to each other with their feet against the plastic and walk sideways.

"But that is their problem, Mathewson. Yours is that your body mass is small in relation to the mass of the vehicle you are controlling, so you are going to have to put in some long-distance crawling."

Stone's erratic crawl took him within a few inches of Kirk. As he moved past he asked quietly, "Are you going to help me?"

"I don't know what he's talking about," said Kirk angrily.

"He's explaining," said Stone, "so a ten-year-old would understand it."

"Sorry, Mathewson, your vehicle does not have attitude jets—we don't want to make the job too easy, do we? But you do have some power—two short-duration thrusters that must be used only to make rendezvous with the recovery ship."

As Stone crawled past Mrs. Mathewson he whispered. "Don't worry, he'll be all right. But I could use some help and it might take your mind off the boy for a while if you—"

"Stop talking about me, Stone," said Kirk suddenly, "or I'll smash you."

"Quiet! Please keep this frequency clear for Pod Fourteen. That's fine, Mathewson—do another circuit on the same line. You won't notice much change until you've been around twenty or thirty times. If you have any problems—call me. Listening out."

ON POD Three the stabilization exercise was not going well. Stone found it difficult enough to keep his feet and legs from drifting away from the plastic skin, but Mrs. Mathewson was in a worse predicament—she had to cover her eyes with one hand, which made crawling virtually impossible, or use both hands and keep her eyes tightly shut, which meant that she could not see where she was going.

Stone said, "Suppose we stand at opposite sides of the pod with our heads together in the center and facing each other. If we grip each other's arms and begin walking forward, I can guide us while you keep your eyes shut. Would you like to try it for a while?"

But the strain of gripping each other's arms was considerable even if they did not weigh anything and their combined length was much greater than the internal diameter of the pod so that the plastic material bulged outward alarmingly under their feet. But they were beginning to get the hang of it when Stone spoke again.

"I never could stand roundabouts as a kid, you know. Or swings. Especially the instant when you stop swinging up and haven't yet started to come down. This—this bothers me. Some time I'll tell you all about my childish fears, but right now I'm busy. Right foot, Mrs. Mathewson. Now the left, slowly. Right. Left—"

On Pod Five the situation was much less orderly, with four slowly struggling bodies and six plastic screens filling the living space. Just after the pod had been released from the ship the screens had been kicked from their fastenings, and there had been too much shouting and crying since then for anyone to

think about replacing them. But Mercer's voice on the radio and the Mathewson boy's trouble had brought silence at least.

"Let's get ourselves organized," whispered Eglin. "We'll start by clearing these crazy mobiles—throw them aft at me and I'll refold them. Then try to stand with your heads together in the center and your feet at equal intervals around the skin like the man said. I'll wear the goggles and keep you on the right line while you're walking sideways."

Later as the women were rotating like a human three-bladed propeller, Eglin realized that he could keep them on the right line by watching how the sunlight struck each of them as it whirled around. The effect was visually dramatic, he thought, and wished that he had had the time to grab his camera.

"Don't rush it, Mathewson. Move slowly and steadily—try to imagine that you are still and that you are pulling the pod around underneath you. Or imagine that you are on the inside of a treadmill. Do you know what a treadmill is?"

Pod Four was already motionless. The opaque, silvered half of its envelope was aimed directly at the sun so that the interior was in darkness and the stars shone cold and clear through the transparent section. It was the first pod to be stabilized and the reason was that Mr. Corrie was an astrophysicist. He had been starting to check his pod's spin before Mercer had left the control room on *Eurydice*.

"I can see Three and Five," he whispered. "Not very clearly and in a few hours they will be too far away to see at all. I wish I knew which was which, but I don't know our direction of travel or whether we are right side up with respect to— But wait. All the pods are points on the circumference of an expanding circle, so that an imaginary line drawn between Three and Five must pass behind us, so that would give our direction of travel. But I still can't tell whether we're upside down or not—"

"Not so loud, George."

"Sorry, I'd forgotten the boy."

"Do you realize, George," whispered Mrs. Corrie, whose aptitudes had always lain in the softer sciences, "that we've never been really alone together for the past eighteen years?"

"Take another rest, Mathewson. And yes, drink as much and as often as you feel like it. Water will never be a problem, but you don't want to let yourself get overtired or overheated—you can't just open a window, you know. Your life-support system will, in normal conditions, handle the heat generated by three adult bodies at rest, but I may have been working you too hard. While you're resting read the instructions on the food dispenser and the other essential services. If there is anything you don't understand, ask me."

In Pod Two Mrs. Wallace was rigging the plastic screens designed to give a measure of privacy to one of the essential services while Simpson and McCall tried to rotate their now stable vehicle into a position that would give them enough light to work without being blinded by the sun. They were doing this by

allowing sunshine to strike the inside face of the entry lock but not to shine into the section enclosed by opaque material.

"Why will water never be a problem?" she asked, then added: "Oh, I see."

A few minutes later McCall, who was studying the instruction booklet, said, "Water will never be a problem because it is recycled, but to me that implies that there will be other problems—food, air, heat dissipation. It says here that the pod food supply is of a low-residue, highly concentrated kind and that its lack of bulk will mean that we will always feel hungry, even though our bodies will have enough to keep them alive. In a three-person pod like this one the food will last just under two weeks, according to this chart. But everyone knows that it is possible to reduce food intake when one is not using energy. I don't get it. People on lifeboats at sea have survived for longer with less food and a desalination kit."

"The people on the lifeboats," Simpson said dryly, "also had unlimited quantities of fresh air."

"Quiet, please." Mercer again.

Mercer's voice erupted from the pod speakers every few minutes for the next three hours. Sometimes what he said was immediately helpful to people in difficulties—either physical or psychological—in certain pods. It was as if he had been listening to them—as indeed he had—and had slipped in the answer to their particular problem during his next conversation with the Mathewson boy. As a result, pod after pod successfully stabilized itself, and the occupants began to rig screens, familiarize themselves with their rather spartan fittings and generally make themselves as comfortable as possible.

There was no panic. Every time a survivor grew excited or even raised his or her voice to an ordinary conversational level, Mercer's voice rattled out of the speaker at all of them to be quiet and keep the channel clear for Pod Fourteen. It was extremely difficult to have a panic reaction in a whisper and knowing that someone else was in a worse fix than their own helped to keep down the fears of many.

But finally even the conversation with Pod Fourteen came to an end.

"Fine work, Mathewson. Leave rigging your screens until later. Right now you must eat and sleep. That's an order.

"You heard that, Mrs. Mathewson—he's all right. You have an astronaut in the family."

In Pod Three Mrs. Mathewson was still holding herself steady with one hand while the other covered her eyes, even though the interior was screened and shaded from the sun. She was smiling and large, weightless tears were being squeezed between her fingers.

Mercer's voice: "Your attention, ladies and gentlemen. Are there any of you—apart from myself—who have not yet been able to stabilize your pod?"

XIII

"PRESCOTT. What are you doing, Mercer?"

Unlike the uncluttered survival pods, the medical officer's segment

had bunks, an airlock and cabinets housing various services projecting into it—its mass was something like sixteen times that of the passenger vehicles. Checking its spin was not an easy matter.

"I'm trying to stabilize the segment," Mercer said, trying also to hide his breathlessness. His legs, arms and shoulders were burning with fatigue and he wondered if the only thing that was keeping his eyes from dropping shut was the absence of gravity. He added: "Another fifteen minutes should do it."

"Good. While you're working, listen carefully. MacArdle is the worrying kind. He has to compute return courses for each pod and crew segment—these will enable us to make rendezvous should the radio beacon fail. To make his computations he has to know where exactly, as well as who, everybody is. According to the book this exercise could be done tomorrow or the next day—even allowing for the increased scatter by that time, the pod flares should be pretty hard to miss. But these people are not trained observers and might miss seeing their neighbors' flares, which means that he would not be able to work out a course for them. He wants that data now. Can you keep young Mathewson awake?"

"The problem there," said Mercer, "is getting him to go to sleep."

"Right. This is going to take a little time to set up as well as to explain. Listen, for the time being ask for clarification if you don't completely understand something, but go on checking your spin. When you've finished you will need a large sheet of paper and a pencil. . ."

It took a half-hour for Mercer to get a clear mental picture of what was needed and to explain it all to the passengers. He then positioned himself close against his canopy, his pod transmitter switched on, his pencil ready and a large sheet of paper with Prescott's diagram on it taped to the side of a bunk.

The diagram consisted of a circle whose circumference was divided into sixteen equal parts, the points numbered from one to sixteen in a clockwise direction. Inside this circle was a slightly smaller one, representing the positions occupied by the crew segments. The circumference of the second circle was divided into four, but the positions were marked lightly because there was no way of knowing at that time where any particular segment was in relation to any given pod. With luck the next hour or so would give this information.

"Prescott. Ready when you are, Mercer."

"Observers in Pod Two and Pod Sixteen stand by," said Mercer. "Pod One, release your flare."

The distress flares burned brightly for thirty seconds, illuminating the expanding cloud of gas they released just before ignition. They faded gradually. Neither the expanding circle of pods nor the smaller ring of crew segments had spread sufficiently for the flares to be invisible because of distance. But Mercer could not see One's flare either in the canopy or through the wide-angle periscope that served the blind areas of his segment.

"Pod Two. I see it."

"Pod Sixteen. Me, too."

"Prescott. I have it."

The first officer had left on his crew frequency receiver so that Mercer could hear Neilson and MacArdle reporting negative results. He himself failed to see One's flare.

"Pods One and Three stand by," he said. "Your turn, Two."

A few seconds later Pod Two was seen by its neighbors and Prescott.

Mercer saw Three's flare bright and clear and, a few minutes later, the flares released by Four and Five. He estimated that he was twice as close to Four as he was to Five and marked his position on the inner circle accordingly. At that point he could have marked the positions of the other segments and named them, because they were spaced equally and he knew their order—working clockwise they were MacArdle, Neilson, Prescott in the captain's segment and his own. But he preferred to wait until he heard them reporting in before marking their positions. He acquired Six and both he and MacArdle were able to see Seven.

Finally the exercise was over. Mercer thanked the passengers for their cooperation, checked the condition of the captain and then strapped himself loosely into his couch.

"Prescott. What are you doing now, Mercer?"

"Sleeping," said Mercer.

"Carry on."

MERCER switched off the pod receiver so that Prescott's voice was the last sound he heard. It was also, after what seemed only a few minutes, the first.

He rubbed his eyes, licked dried lips with a dehydrated tongue and said, "I'm awake, I think."

"You snore like a shuttle taking off, Mercer. Now listen. I have been doing your job for you—eavesdropping on the survivors—for the last hour. Some of them are beginning to sound worried. But before you start telling them lies, which you are very good at, I want to make sure that your lying and half-truth telling will have a tenuous connection with the real facts of the situation. I don't want you to be caught out in a lie, you understand, because that could be very bad for morale. So, I am a nervous passenger. Reassure me."

"I don't under—" began Mercer. Then he cleared his throat and said, "What exactly is troubling you, sir?"

"I'll tell you what's troubling me, mister. The smell of this overcrowded goldfish bowl is troubling me. How soon do we get out of it?"

Mercer pulled out his book, then realized that Prescott would probably hear him flipping through the pages—and replaced it. He had a good memory.

"You must realize, sir," he said smoothly, "that all this is largely the product of your mind and its awareness of your crowded conditions—this awareness heightens your sensitivity to perspiration and similar odors. These are not—repeat not—due to any malfunction in your capsule air-conditioning or waste-disposal or reclamation systems. As for recovery, that should not be delayed by more than

a few days—"

"Wrong, Mercer. It could be delayed for more than two weeks."

"Oh," said Mercer. But Prescott was not giving him time to think.

"We're hungry and it's hot in here."

"You can increase the apparent bulk of the food by adding water, sir. There is no shortage of water."

"We don't like the water. It stinks, too."

"In actual fact, sir, your capsule water, recycled as it is, is much less harmful than that taken from any Earthside reservoir—there is much less pollution in it, for one thing. I'm afraid the smell is purely an illusion, sir—it comes from your dwelling too much on its source. As for the temperature problem—that is caused by body heat produced by your recent exertions in getting your pod stabilized and your screens set up. You have also—probably—been moving around and using energy—producing heat—simply because you are excited or curious about your new surroundings. The correct course is to relax and remain absolutely still in the shade of your individual screens and remove some clothing if you have to until the air-conditioning system brings down the temperature. Drink and talk as much as you like, but don't use energy because that produces heat. If you do as I suggest you will find that the pod temperature will remain comfortable and even for—"

"Sorry, Mercer. It will get a hell of a lot hotter. *Eurydice's* course, which is also ours, passes within the orbit of Venus and makes its closest approach to the sun in nine days' time."

Angrily, because he was suddenly frightened, Mercer asked, "What about the recovery ship? Why do we have to wait?"

"I'm supposed to be questioning you. But I'll give you the facts so that you'll know how best to bend them for passenger consumption. The countdown on the recovery ship was started before we abandoned *Eurydice* and at present it is holding at minus twelve hours, which is the time needed to ready the high-acceleration boosters. It is waiting for the same reason that we are—for *Eurydice* to blow."

"The sooner the better," said Mercer with feeling. "Then we can head back to the rendezvous point."

"Well, no. You would be right if the reactor and cargo radioactives blew up relatively slowly and threw off chunks of slow-moving radioactive debris. We could wait for a day or so until it had cleared the area and there would be no need to delay launching the recovery ship. But suppose the ship becomes a bomb that flings out a sphere of vaporized metal and generally acts like a scaled-down nova. Close in, this material would go through the capsule plastic like a charge of microscopic buckshot, besides flooding the area with lethal radiation. At the present time we are much too close to survive it. But the radiation and the effects of the debris diminish with distance. You know about the inverse square law, I suppose?"

"Yes," said Mercer. "But how long do we have to wait to

stand a fair chance of surviving the blowup?"

"A few days. But obviously we can't start back to the rendezvous point until after she blows, or we would be heading into trouble instead of out of it. A complication is that the reactor's fail-safe devices may hold longer than we want them to."

"But the A thrusters in the pods will only accelerate them to sixteen feet per second, which means that they can kill their outward velocity and return at eight, their present outward speed. The operational life of the pods is only two weeks."

"A little more if the occupants do nothing but breathe, sleep and talk without getting excited. You must try to keep them from becoming excited."

"Worried or frightened, you mean?"

"I mean excited."

"Oh."

"Now you will be able to explain to them why the recovery ship will not be launched until after the blowup. Remind them that it is an unmanned, high-acceleration job that will waste no time in getting here. There is something else you should do, although there is no great urgency about it. Try to teach the passengers some elementary astronomy. Neilson tells me that, despite the superheated steam that exited from the stern for a few hours after we abandoned ship, *Eurydice* has not pulled ahead as quickly as we had hoped. That could mean that the rendezvous beacon might be damaged when she blows and the fancy pod navigation aids that make repositioning the pods for the rendezvous burn such an easy job will not be working. The passengers may then have to take up the proper attitude the hard way and get it right first time."

"I understand," said Mercer, wondering where his saliva had gone.

He had been too busy until now to have time to feel afraid and he had, in any case, thought that the worst was over when passengers and crew had escaped safely from *Eurydice*. But the truth was that they had not yet escaped *Eurydice* and if they did they might not be able to get back to the pickup point before their consumables ran out. Too, there was no absolute guarantee that the recovery ship—which was unmanned and had a long way to travel—would make the rendezvous point.

"That about covers the situation, Mercer. Is anything else troubling you?"

Mercer was silent for a moment, thinking about his problems but afraid to start listing them—he might begin to whine at Prescott. He would rather die than show fear to the first officer. He wondered, not for the first time, if bravery were simply a stronger fear of being thought a coward.

"Yes, sir," he said finally. "I am a ship's officer needing reassurance. Reassure me."

XIV

MERCER dispensed a mixture of heavily shaped truth and quiet optimism with the result that the passengers, after six days

in the survival capsules, were uncomfortable but not unduly worried. A fair proportion of them were unworried enough to feel bored and, despite Mercer's warnings, made attempts to relieve their boredom in fashions that generated a lot of heat.

Pod Four was not the first to generate excessive internal heat and probably it would not be the last.

After allowing the higher levels of his mind to be withdrawn from all effective control of his body for several hectic minutes, Corrie was suffering his usual reaction. It took the form of being coldly analytical about everything and everyone around him.

"I cannot understand why it is so hot," he said. "Granted that we are part of a closed and balanced system into which energy in the form of heat has been introduced, there are only two of us in a capsule designed for three, which means that there should be a fifty percent margin on cooling, air supply, food. The second law of thermodynamics indicates that—let go of me, dear, I want to try an experiment—if I set myself spinning in the middle of the pod the only energy needed will be that required to initiate the spin. But the movement of air past my skin should have a cooling effect—"

"Don't move," said Mrs. Corrie drowsily.

"But we're hot and slippery and —I wonder what it's like on the capsules with three and four people. It must be really hot."

"Not if they behave themselves like the man said, George."

Corrie laughed. He said, "Any minute now our Listening Tom will read us a polite sermon—couched in very general terms, of course, and not mentioning the sinners by name—"

"Your attention, ladies and gentlemen, I must remind some of you once again to refrain from unnecessary physical exertion. Rest, conserve your food and air. Exercise should be purely intellectual. I have suggested, and a few of you have devised, some useful question-and-answer games.

Mr. Mathewson, it is time for another astronomy lesson. . ."

It was really hot in Pod Five, almost unbearably hot. But the occupants had no way of knowing how much worse were the conditions in Five than in the pods carrying the Corries or the threesome of Stone, Kirk and Mrs. Mathewson, so they simply complained as everyone else was complaining. Some complaints went unvoiced—about stench produced by sweat and the overloaded waste disposal unit and the equally overworked water reclamation system for instance—because they all were trying hard not to think about those particular problems.

In Five the plastic screens which had shielded the occupants from each other had been dismantled when the inmates discovered that privacy interfered with the free circulation of the air. The removal of the screens generated a lot of emotional heat while making the environment fractionally cooler. Surprisingly, the removal of other items that interfered with the free circulation of air, such as clothing, was accomplished with very little

fuss. It had become much too hot to worry about clothing or the neo-Puritanism which dictated that the female body be completely covered except in the privacy of the home. Perhaps Pod Five was beginning to feel like home.

"I'm hot and hungry," said Mrs. Kirk suddenly. "I've read about people being cold and hungry. I envy them."

"And I envy you," said Miss Moore, who was spinning slowly about her longitudinal axis, legs and arms akimbo and even her fingers open to catch the maximum benefits from her self-generated breeze. She went on, "I envy your flab. You've got more fatty reserves than the rest of us put together and an enforced diet is just what you need. By rights you shouldn't eat anything because we will starve long before you do, especially if we go on splitting the food four ways. I'm hungry, too, damn you."

"It isn't nice to call me flabby even if it is true," said Mrs. Kirk. "Besides, my husband is even fatter than I am and he must be suffering terribly by now. Fat people have enlarged stomachs, you know, and feel much hungrier than slim ones like you. But you are just afraid of being so thin that Eglin will stop ogling you."

"I want out of this thing," said Miss Sampson. She was drifting close against the transparent section, staring into space. "Please, can I get out of this thing?"

"Don't be stupid," said Miss Moore without taking her eyes off Mrs. Kirk. "Your pigmentation gives you protection against the heat and you people are born and raised in famine conditions."

"I think you're wrong," said Mrs. Kirk. "Their skin color protects them against strong sunlight, but not against high humidity. I remember reading that—"

"Reading must have been your only form of amusement," said Miss Moore, "and looking at you I can understand why."

"That isn't—"

"I can remember reading a story," Miss Moore went on, "where the oldest and most expendable member of a party of travelers was sacrificed for the safety of the others. They threw her to the wolves, as I remember. We would not be so wasteful. What do you say, Sampson? Cannibalism was practiced by your people fairly recently. Give us the benefit of your expertise."

"Soap, bathe," said Miss Sampson. "Swim in the sea."

"I DON'T blame her for ignoring you," said Mrs. Kirk, She paused for a moment and when she went on her voice was quiet, reasonable and utterly malicious. "Seriously, you would never get hungry enough to eat me because you haven't really thought about what it would entail. Not all of me is edible, you know, and the waste disposal unit will take just so much. Bones, for instance. Some of them would be big and hard to break up into a convenient size for the unit—especially when they are freshly gnawed and slippery and you can only use your teeth and bare hands to break them. And then there are items like hair and toenails and lungs and eyeballs and—"

"You're making me sick."

"If you are as hungry as you say," said Mrs. Kirk, "I don't see how you can have anything to be sick with."

"Shut up," said Eglin, "both of you."

For a few moments silence reigned, although the atmosphere was thickly charged with anger in addition to the heat, humidity and a multiplicity of body odors. Eglin could not help noticing the atmosphere because his lips were pressed together in anger and he was breathing heavily through his nose as he glared at each of the three women in turn.

During the first few days in the pod Eglin had been too embarrassed even to look at them when they were fully clothed, because he usually found that they were looking at him and he did not know what they were thinking or what they thought he might be thinking when he looked at them. And when the increasing heat and humidity forced them all to peel, the situation had become even more embarrassing—but only for a short time because very often he was in fact thinking what they thought he was thinking and there was no way for him to conceal the fact. So he had begun staring at each of them in turn so that their feelings would not be hurt by his appearing to admire one of them more than the others.

Now he was too hot and angry and frustrated and hungry to bother showing consideration and he spent most of the time watching Miss Moore because she was the best-looking one and she usually caused the most trouble.

Eglin ran his hand over his forehead, face and the wet, black smear that was his week-old beard, pushing away the thick, weightless drops of sweat. He thought of several ways of making Miss Moore stop her continuous arguing and sniping and blatant displaying of her undoubtedly beautiful body, all of them pleasant to him. He was so engrossed that the trouble had already started before he realized that there was any danger at all.

Miss Sampson was sobbing and clawing furiously at the plastic envelope and her nails were long because, unlike the other two, she did not nibble at them when she was worried. When the fury of her attack caused her to drift away from the plastic, she kicked at it. The act sent her bouncing against the opposite side, where she clawed and kicked again. With each bounce the fabric of the pod stretched and bulged frighteningly and the sun bobbed over the edge of the opaque section. She collided several times with Miss Moore and Mrs. Kirk, but accidentally, because she did not try to attack them. At least not until Mrs. Kirk tried to restrain her and got two long, red nailmarks on her forearm for her trouble.

Cursing, Eglin planted his feet against the solid plastic of the services panel and launched himself on an interception course. They collided softly and awkwardly, rolling and bouncing along the plastic canopy until they ended in the middle of the pod spinning slowly together.

By that time Eglin was facing her and had a tight grip on both her

wrists and was holding them against the small of her back. He was afraid for a moment that she might use her knees on him or take a bite out of his face with her even and startlingly white teeth, but suddenly she relaxed against him and began to cry.

"Nice try, Sampson," said Miss Moore furiously. "Hysterics, a good old-fashioned wrestle and then the dissolve into tears—the oldest trick there is. But it isn't going to get you anything, Sampson, because it's too damned hot in here as it is. You just get *away* from him!"

"Jealous?" asked Mrs. Kirk.

But she and Miss Moore were each gripping one of Miss Sampson's shoulders and pushing Eglin away with their free hands. He realized, not for the first time since they had been flung away from *Eurydice* together, that he was living in a wish-fulfillment dream but that for all the good it was doing him he might just as well be living in a monastery.

"All right, all right," he said in a tone that said that nothing, most decidedly, was right. "If you can't sleep and won't stop nagging at each other, let's do what the man says and try a little intellectual exercise—guessing games." He flung out an arm in an angry wave that encompassed the pod, the people in it and the whole of creation outside, and said, "I'm thinking of something beginning with—with 'S.' "

"Sagittarius?" asked Mrs. Kirk, beginning the game.

"The—the sun?" Miss Sampson inquired.

"Obviously," said Miss Moore.

Mercer's voice: "If you can't see the constellations as I've described them, don't change the attitude of your pod. Spin yourself very slowly inside the transparent section and watch the stars until you see the proper formation. That way uses less energy and produces much less heat."

IN POD Three the situation was somewhat different. A hypothetical observer armed with an accurate thermometer would have said that the internal temperature was fractionally cooler than that of Pod Five. A psychiatrist would have been worried sick.

Kirk drifted like some lumpy, organic airship over the services panel, permanently tethered to it by one fat, hairy hand. His eyes never seemed to leave Mrs. Mathewson who floated at the other end of the pod. The only times he did not watch her was when Stone managed to drift between them, which was as often as possible.

No guessing games, no quizzes, no group intellectual exercises of any kind took place in Pod Three. When Kirk spoke he broke a silence that had lasted for at least six hours.

"Why does he talk to the kid so much?" he complained. "The boy is a special case, I know, but Mercer could surely give someone else the benefit of some of his individual attention."

It was a reasonable complaint compared with some of the others he had made earlier and his tone was conciliatory—as if he were

trying to start a conversation that would not end in a bitter argument.

Mrs. Mathewson brushed away hair clinging wetly to her face and said, "I think he's trying to teach and help all of us, as Mr. Stone said, and is pretending to teach only Bobby so as not to offend the others by making his instructions too simple for them."

She looked from one man to the other, trying to bring them together and pleading silently with Stone not to make things worse. But Stone was not looking at her and so could not hear the silent pleading.

"You're cheating on the food, Kirk," he said. "We aren't getting our fair share."

"You don't need a fair share," said the other man. "A skinny runt like you needs to eat hardly anything."

"I've always wanted to try a crash diet," said Mrs. Mathewson, still trying to pour on verbal oil, "and never had the nerve. But now—"

"Inside every fat man," said Stone, still not looking at her, "there is a skinny slob who let himself go."

"Please," said Mrs. Mathewson, "please stop fighting over the food."

Stone drifted slowly around to face her. He said, "Use your brain, woman. We're not fighting over the food."

Mercer's voice: "Your attention, ladies and gentlemen. As you know we are following *Eurydice's* original course. During the next few days it will make its closest approach to the sun. Let me assure you that the temperature will not rise above bearable limits even in the overcrowded pods, provided you remain at rest and do not generate unnecessary heat. The food supply is adequate, it is simply that its lack of bulk makes you think that you are starving. The elevated temperature is also causing a rapid loss of weight. Think of the situation as follows: taken as a whole, Earth is also overcrowded and underfed, and firm control is needed if the available resources are not to be wasted and the population is not to perish of its own pollution or by too much self-generated atomic heat. You people are all facing the same problems on a greatly reduced scale and some of you are having to adapt to situations you rarely, if ever, were involved with on Earth—social imbalance, conflict, even a small-scale war may here seem to be unavoidable. But a war will kill everyone in your tiny plastic world just as surely as it would decimate your home planet. You must avoid fighting at all costs. Remember that you are human beings and not animals—and keep control."

In Pod Fourteen control was easy, if slow. Mathewson knew exactly how to change the attitude of his vehicle and he was learning how to line up the dividing line between the clear and the opaque material with groups of stars when Mercer gave the order. He was hungry, but not very, and he was not uncomfortably warm even with his uniform and cap on. Fourteen's life-support system, catering as it was for one young boy instead of three adults, was keeping him comfortable.

Mercer had given him permission to strip if he wanted to, but had

warned him against exposing his skin to the sun. According to Mercer the only space-tanned astronauts were the ones who appeared in TV plays. Real spacemen avoided the sun. A good spaceman learned to control himself as well as his ship, Mercer had said, and to keep his mind busy and alert. Space was beautiful—but lonely and dangerous if one did not keep control.

Mathewson knew that he did not always keep control. Sometimes he wanted to play some other game than this one of spaceman, which never stopped. At such times he tired of memorizing stars and doing practice runs over the tiny control panel or crawling inch by inch along the plastic to keep a certain star exactly in position. But he could not change the game and he couldn't even stop playing it.

Sometimes he wondered if Mercer knew when he lost control and started shouting to fill up the emptiness—or crying because nobody was near him. After he had cried the first time Mercer had explained to someone in another pod that there were psychological and technical reasons why he could not arrange two-way contact with separated husbands and wives and loved ones. He had said that arguments within the pods were hard enough to control without risking their starting between the capsules and that the passengers were becoming so widely scattered that his receiver's speaker could not be turned up loud enough to energize his transmitter mike, which was on a bulkhead several feet away.

But Mercer could not have heard him crying because Mercer had not changed. Mercer had started by treating Mathewson like one of the crew and had not changed at all. As the commander of this spacecraft Mathewson should not be caught crying and he should stop doing it before his luck ran out and Mercer caught him at it.

But sometimes when he awoke with no bed or blankets around him, just warm air and plastic and very faraway stars, he could not help becoming frightened.

Mercer's voice: "Attention, attention. I have received a signal that *Eurydice* will blow in approximately three minutes. Whatever you are doing, cover your eyes at once. Keep them covered for at least thirty seconds after the flash. Do not, I repeat, do not try to watch it through your goggles or peek at it between a crack in your fingers. If you look it could be the last thing you will ever see."

While he was speaking Mercer pushed the captain's bunk into its recess and shut the airtight flap. Between the metal of the bunk, the bandages and the damaged eyes which might not be capable of registering light anyway, Collingwood was adequately protected from the flash. Mercer covered his face as he had told the passengers to, because Prescott had told him to do it, but in much more pungent language.

Despite his hand and his tightly closed eyes behind it he saw the flash as a bright, pink blotch that faded very slowly.

When he uncovered to look outside he saw a beautiful, spherical aurora writhing and expanding to

fill all of space. The radio brought in a deafening rattle of static and the radiation level was climbing steadily.

While he had been relaying Neilson's warning Prescott had said that the reactor's safety devices had kept the cork in too long and that it would be a big one—possibly the biggest nuclear explosion so far, but they should be safe. Mercer hoped that the first officer was not simply trying to be reassuring.

XV

THROUGH the window of Brannigan's office the recovery ship loomed against the sky like a narrow white pyramid wrapped in the red lace of its service gantries. There were no signs of activity on or around it, but that situation could change within a few minutes. The decision would be Brannigan's alone and he should take it now, instead of pretending that it would be arrived at by the democratic process of listening to advice. Brannigan swung away from the window to stare along the center of the table that joined his desk like the vertical bar of a fat, gray *T*.

To nobody in particular he said, "We're wasting time."

"I disagree," said Perkins. "It is less than thirty-five minutes since *Eurydice* blew."

"That bird out there costs nearly twice as much as the lost ship," said Musgrave. Then, apologetically: "As the company accountant I'm supposed to remind you of things like that before you throw good money after bad."

"He has a point," said Beck. "The delayed blowup will not hurt anyone, but a lot more delay will be caused while making sure that untrained passengers orient themselves properly toward the rendezvous point plus, of course, the time needed to get there. I can place our bird within one thousand meters of the rendezvous beacon—but will there be anyone there to rescue? We really should wait until we have their report on the consumables."

"We might wait a long time," said McKeever in his dry, lecturing voice. "The blast has converted *Eurydice* into a rapidly expanding zone of radio interference—rather like a spherical Heaviside Layer—through which we, with our high-powered equipment, can punch a signal. But they won't have the power to answer us until the volume of interference has enlarged and become so diffuse that their signal and that of rendezvous beacon—if it still exists—can get through. The shortest estimate that I can give for the clearance of this radio fog is three days—and it seems to me that Beck cannot simply aim at the center of the explosion. Neilson used a crude steam jet—whose angle and thrust are not known with accuracy—that caused *Eurydice* to move ahead and probably veer off course. If we are going for a late-evening launch we will have to use the figures MacArdle gave us."

"But can we accept them for a launch as important as this?" asked Beck. "And if the beacon has been taken out by the explosion, how will the passengers find their way to the rendezvous point?"

Dr. Lassiter cleared his throat. He said, "With one exception I know these officers very well indeed. You can accept MacArdle's figures. As for the passengers' making rendezvous without a beacon, you know that the medic has been giving them simple lessons in astronomy and astronavigation—coached by Prescott and MacArdle, of course."

"Do you approve of Mercer?" asked Beck. "Does Prescott?"

"I do," said Lassiter, "and Prescott approves of nothing and nobody. But he hasn't called Mercer incompetent, which is tantamount to an unsolicited testimonial. The part that worries me, however, is the fact that the pods will arrive at the rendezvous point dangerously low on air, and the two overloaded capsules will be in even worse condition. That ship out there is fast—but we've had to wait a long time while *Eurydice* made up her mind to blow and the survivors are quite far away now. My figures aren't as accurate as Beck's, but I'd say that if we don't launch as soon as possible there will be an awful lot of freshly asphyxiated corpses at the rendezvous point."

Dr. Lassiter represented the softest science in the room, which was why he tended to worry more about the space-going software.

"That's it," said Brannigan abruptly. "We try for a rescue."

THE decision taken—apparently by democratic process—Beck communicated it to the launch crew. Any remaining questions would be those of policy and where policy was concerned, Brannigan was a dictator.

"If we go for a rescue," said Westgate suddenly, "we will have to say a lot more about the disaster. What do I tell the media?"

"Nothing," said Brannigan. "The first major accident has occurred to a passenger-carrying spaceship, the passengers and ship's officers are safe in their survival capsules and a rescue operation already formulated to meet this contingency has been put into effect. Nothing more until we know whether or not it is successful."

Westgate's objections were as smooth as a good PR man's should be and not immediately identifiable as objections. He said, "Yes, of course. There have been no fatalities as yet and there is no reason to worry the next-of-kin until they actually occur. At the same time—we are going to be held responsible for this disaster by the public, even though we can show that it was a vendor company who was really to blame. Unless we focus a lot of unwelcome attention elsewhere for a while—long enough for us to work out satisfactory answers to a number of very awkward questions—we could take an awful pasting from the press and TV. Those boys hate like hell to have anything kept from them.

"This is the first disaster of its kind," Westgate went on, "and it has everything. The captain injured, perhaps dying and unable to direct the survival operation. One pod with a kid in it trying to do the job of three men. The conditions inside the pods while they were waiting for *Eurydice* to blow—the

heat and hunger and overcrowding, the strangers thrown together into conditions of intimacy, and that imbalance sexwise. It is the biggest cliffhanger since Apollo Thirteen. There would be no problem in slanting it to make us look like heroes instead of villains and for me to handle it so that the majority of the media people will feel obligated to us for life—"

The others joined in some agruing with Westgate and putting up alternative suggestions—everyone seemed to have the idea that public relations, like writing, photography and painting, was a job that could be performed just as well by amateurs. Dr. Lassiter sat staring silently into the far distance at fragile plastic bubbles full of hot, stale and stinking air, thinking of the people who were being forced to breathe it. Brannigan was staring into the same area of space.

"Checking sequence initiated on booster rings Two, Three and Four," said a voice from the speaker on Brannigan's desk. "Checks completed on tanks A and B on ring One and fueling under way. Minus eleven hours and thirty-seven minutes and counting. . ."

EVERYTHING looked so normal and peaceful, Mercer thought resentfully as he tried to dry the perspiration from his face with even sweatier hands. The vaporized plastic and metal that had been the ship had cooled and scattered into invisibility and only the deafening rattle of static on the pod frequency was left, that and the readings on the radiation indicator, which were rapidly slipping back to normal.

He had turned down the volume on the pod frequency because the voices he heard were either lost in the mush or were all sounding off at once. In order not to feel completely useless he spent some time helping the captain—stripping him of all but his bandages to make him feel as comfortable as possible and reinforcing his sedation. Then Mercer drifted back to the canopy to think and sweat and look at the stars.

Static erupted thunderously from his speaker—a whisper of intelligence was trying to fight its way through the din. Mercer gritted his teeth and moved closer.

"Prescott. Come in, Mercer."

"Mercer here. Go ahead."

"Prescott. Come in, Mercer. Try to . . . against the mike and . . . be able to hear you."

Mercer put his lips within an inch of the mike and acknowledged at the top of his voice.

"Better. Now listen carefully and . . . for a repeat if you don't . . . MacArdle says that this muck will clear over the next few . . . will allow pod and segment frequencies to be worked in about two hours. Two-way contact with *Eurydice* Control will not be possible for at least . . . but they know what to do without my telling them. Our job is to get the pods headed back . . . possible after the segments are on their way, I will link you to . . . your instructions. In case you're thinking that it's wrong . . . passengers should go first. We must . . . rendezvous first to help look for them . . . on stragglers. If you understand

. . . to MacArdle."

"I understand," Mercer shouted and a new voice began fighting its way through the interference.

"MacArdle. The beacon was taken out by the blowup so . . . the hard way. Your A thrusters are set below the floor grill center line. When you fire make . . . you are diametrically opposite . . . occupied by the captain so that . . . weights will be equally distributed about your center of thrust. Have you got that?"

"Yes," bellowed Mercer.

"You won't be able to see the sky in your direction of thrust because of the segment configuration and neither will the pod people because their services module will be in the way, so you will have to establish attitude from points at right angles to your proposed line of flight. You will . . . sitting position with your back to the seal and sight along the top edge of the third line of bunks. The glare shield supports will give you a second referent and . . . lower half of Orion projects from the right into your canopy field of view just above the center line. Below . . . Sirius on the opposite edge of the canopy and, although you won't be able to see it from that position, if you lean to the left you will have Aldebaran and above it the Pleiades as a check. Do . . . repeat that?"

"No."

"You understand . . . a first approximation and that . . . more accurate attitude checks later. Is there any other information you need?"

"No, thanks," yelled Mercer. He added: You seem to have a photographic memory where my segment is concerned. Were you a patient in it?"

"Detailed structural data . . . in the captain's segment. Prescott worked out the sighting arrangements. But now you must get your segment lined up with . . . me know when you're ready for the first attitude check."

"I'll give you a shout."

"That's very good, Doctor."

"Prescott. Stop chattering, you two. MacArdle, Neilson next. Mercer, you know what you have to do."

WHILE Mercer sweated at changing the attitude of his segment he could not help looking at the locked control panel set above his couch. Like the other crew segments, his had provision for making rapid and accurate changes of attitude, but anyone who was not a trained astronaut could very easily send his vehicle spinning helplessly out of control if he tried using anything but the premeasured A and B thrusters. Prescott had not even mentioned the possibility of Mercer's being able to fly the vehicle, much less forbidden him to do so.

The radio interference had faded a little as he worked. When Mercer turned up the volume on the pod frequency he could make out a babble of voices through the static. Apparently they were now close to the center of the expanding sphere of interference and signals could get neither in nor out. But the sphere was hollow and the people inside it could talk to each other and would be able to do so with less and less trouble as time went on.

He heard every word MacArdle spoke while he made the tiny movements that placed the segment into its pre-burn position. He held himself still as instructed, making sure that the segment was not drifting off the line. But when MacArdle spoke again he could not move at all and for several minutes he could not even speak.

"MacArdle. Acknowledge, Mercer. Have you got trouble?"

He could actually feel the globules of sweat growing on his skin, making his hands slippery and his back skid along the lock seal. He shook his head violently and the newly dislodged perspiration drifted before his face and tasted salty when he breathed it in. The stars burning coldly through the canopy were suddenly a mass of incomprehensible lights with no recognizable order or meaning, the imaginary lines that linked them together gone so that he did not know what he was seeing.

Mercer had thought that he could not feel more afraid than he had in the howling, steam-filled chaos of the passenger compartment of *Eurydice*—but he had been wrong.

"I—I don't think I've got this right," he said finally.

The ensuing silence stretched through an eternity, though it could only have lasted for a few seconds. Mercer wondered if MacArdle would speak or if Prescott would cut in with some pointed and abrasive comment. He could imagine what the first officer was thinking about him now.

"MacArdle. You seemed to be doing fine until a few minutes ago—I mean, the Pleiades and Sirius and Orion are pretty distinctive referents. But just try to relax. Drift forward to the canopy and have a good look around to make absolutely sure that you have the right constellations. Make sure you shield your eyes from the sun or you'll waste a lot of time waiting for your night vision to come back. But take your time. Don't let me rush you and don't push the button because you're afraid or ashamed or because you want to put yourself out of your agony. You must get it right first time."

Mercer's voice wouldn't work.

"Maybe the captain can help you."

"The captain is under sedation," said Mercer sharply, "and he can't see anyway. I would only be giving him something more to worry about. I'll go forward and have another look around."

"I was going to ask you to do that in any case, Doctor. We all have to double-check on something as important as this. And remember, when you start your burn give me a ten-second countdown so that I will know the exact time of firing and the time you will have to fire your B thrusters at the rendezvous point—otherwise you might go sailing past. And don't worry if nobody seems to be there when you arrive—we may be too widely scattered to see each other without flares."

When the burn came the sensation of weight was so strange that Mercer thought that he would drown in the softness of the bunk. In a few seconds it was over and he coiled and stowed the cable and

remote-control switch which had enabled him to fire the thruster from his position opposite the captain.

"Prescott. The sooner the pods are turned around the better, Mercer. You have done most of the talking to them so far and you may as well continue. How will you handle it? Numerically?"

"Yes," said Mercer. "Taking them in numerical order will stop any argument about who gets instructions first—but there are three exceptions. Two of the pods are carrying four people and will run out of air before the others and nobody will object to the Mathewson boy's jumping the queue—"

"I do, Mercer. Bringing back the overloaded pods first is a good idea, but the boy can comfortably wait his turn or even come in last. He will not, repeat not, run out of air and food."

"I understand," said Mercer.

"Good. Now go to work on the passengers. Don't waste time, but don't appear to be rushing them either. MacArdle will give you the referents for each pod as you need them and you will translate them to your passengers. I, ah, know that you will appreciate their problems."

XVI

"ONE of us," said Stone, "is considerably heavier than the other two. Will this swing us off course when we apply thrust?"

"Not very much, Three, but you may as well get it absolutely right and seat the two lighter passengers closer together and facing the heavy one. But make sure that your movements have not set up a drift away from your marker stars."

"You never miss a trick," muttered Kirk.

"Don't be so blasted sensitive," returned Stone. "I deliberately did not say which of us was the fat one and I very much doubt that Mercer remembers us. Relax, Kirk—it was a purely technical question. Or is the thought of my sitting close to the lady bothering you?"

"Don't tell me to relax in that tone of voice," said Kirk angrily. "You're deliberately giving Mercer the impression that I'm ready to go beserk and that all I can think about is women."

"You certainly haven't thought much about repositioning this thing," Stone replied. "And don't *move* or we'll have to spend another half-hour getting the right stars lined up. Be a good man and wait until after the burn before you take a swipe at me."

"I haven't had to think—with a cool, scientific mind like yours directing the operation," Kirk said. "Or maybe you are just pretending to know it all so that she will think you are some kind of champion scientist who deserves—and intends to claim—his prize."

"Shut up, Kirk."

"In a minute. I just want to remind you of a scientific fact. This overweight body you are always making cracks about and she tries not to look at has lived on Earth for fifty-two years. It has developed muscles to lift and move itself around under one Earth gravity—pretty big muscles, though they don't show—and in weightless con-

ditions they will not be hampered very much by the fatty overlay. Just remember that before you start claiming any prizes."

"Stop it," said Mrs. Mathewson, speaking for the first time that day. "Stop fighting and stop talking about me as if I were one of the food packs. You're both old enough to have more sense. Besides, the lucky winner could not claim his prize—if he tried we would all die of heatstroke."

"Attention, Pod Three. Are you stable and ready for thrust? Do you want to recheck your attitude?"

"We have rechecked our attitude four times," said Stone, glaring at Kirk, "and we're as stable as we're ever going to be. And anybody with half a brain knows that if we haven't got it right we've no hope of reaching the—"

"Relax, Stone," said Kirk nastily.

"We're firing—now," said Stone.

"Thank you, Three. I shall pass you the repositioning information in plenty of time for you to fire the braking thrusters at rendezvous. Pod Four, come in, please."

The operation was smooth and fast on Pod Four because Corrie had been listening to Mercer's instructions to the other capsules and had already worked out a close approximation of his pod's firing attitude, so that only a few minutes spent on minor corrections were needed to position it accurately. The relationship between Mercer and the astrophysicist during the exchange of information was that of a pupil and a rather irascible teacher—and Mercer was not the teacher. Corrie did most of the talking until the moment he pushed the thrust button and his wife made a sound that would have been a scream if she had not been breathing in at the time—and pointed.

"Don't wave your arm about, dear," said Corrie, "or you will cause a deviation in course. But I see what you mean."

"Having trouble, Four?"

"Just an unpleasant surprise," Corrie replied. "When we applied thrust the sidewalls bulged outward and the locksection forward looked for a moment as if it would come down on our heads. Actually it approached by only a few feet and now that thrust has ceased, it and the sidewalls have returned to normal. But you might have warned us that this would happen. That was inconsiderate of you, Mercer."

Corrie waited for more than a minute, then said testily, "Mercer, did you hear me?"

"I heard you, Four. Sorry about that. Was there any indication of a swing off course when it happened?"

"No deviation," said Corrie.

"Good. Thank you, Four. Pod Five, come in."

AS CORRIE drifted away from the services panel he wondered if he had detected a note of strain in Mercer's voice. He was becoming quite familiar with the sound of the medical officer's voice because, as was the case with the occupants of all the other survival capsules, it was the only outside sound he heard. He wondered why Mercer had waited before answer-

ing him. Was Mercer irritated because a passenger had made a legitimate complaint at a time when he was very busy? Was he feeling as hot and uncomfortable as was Corrie and panting in the stinking, humid air as if he had just run a mile? Or was it simply that Mercer had been talking so long, repeating the same instructions over and over again, that he was going hoarse?

But there was no way of escaping Mercer's voice, so Corrie panted and sweated and listened to the medic being patient with the stupid ones and reassuring with the frightened ones and both at the same time with the majority of them. The only consolation was that Mercer seemed to be speeding up the process—while one pod was lining itself up on its marker stars he had taken to giving the next two pods their attitude instructions.

He ran into a slow patch between Pods Ten and Thirteen because the sun occupied the sky close to their markers on one side and the passenger wearing the goggles could not see the stars clearly and the others dazzled themselves trying and had to wait until their night vision returned. Mercer's voice was quite loud during this period, probably because the pods concerned were at extreme range for his radio.

Corrie wondered why the other officers were not helping him, but then decided that Mercer's radio was probably designed for this kind of work and it was his duty to look after the survivors while the other supermen did what they had to do about organizing the recovery. He had not spoken to any of the other officers and had seen two of them only briefly, but he recognized the type. They were the kind of men who were tops at their job, highly trained and even more highly intelligent misfits who did not communicate easily with normal people.

Corrie understood them very well because he was that kind of person himself, a refugee in a do-it-yourself ivory tower.

Possibly the injured captain had been less aloof. Corrie had heard a few words Mercer had not intended the passengers to hear before the medic had remembered to switch off, so Corrie knew that Collingwood was unfit for duty. Which was a pity because Collingwood, judging by the way he had chatted with the passengers as they were coming aboard, might have been able to mix socially during the voyage. Or it might be that the crew was not allowed to have anything to do with the passengers—especially female passengers—in the interest of discipline.

Except for the ship's medical officer, that was, who had acted like a glorified steward and not at all like a superman until the disaster had occurred. He could imagine the feelings of the other officers toward the one who had free access, professionally and otherwise, to the passengers. They must have been knotted up with envy with people like the Moore girl undulating about the ship. Or did they sympathize with Mercer instead, looking down on him from their control-room monastery as a kind of worker priest whose duties placed him in the greatest danger of all, that of being blackballed out

of the club if he made a slip?

Mercer's voice: "Pod Fourteen—come in, Mathewson. Twelve and Thirteen will need a little time to check their attitudes and you may need even more because of your small mass. I shall read your marker stars so that you can start lining up your vehicle now and save time when I come back to you for the final checks. Ready to copy?"

Corrie cursed the heat and the air that would not stay in his lungs for more than a second, but not loudly enough to interfere with the conversation going on between Mercer and the boy. When he was physically or mentally uncomfortable he had a tendency to lash out at people or, if they were not within lashing distance, to think nasty thoughts about them.

It was quite possible that Mercer was passing on instructions from a book. The medic's treatment of the boy was, on the surface, completely unsympathetic. But Corrie knew that he was judging the situation by only one half of a conversation. If he could hear the other half he would know how thoughtless Mercer was being toward the boy—or otherwise. Certainly there was no indication in the half Corrie could hear that the boy was frightened or hysterical or unable to handle the job properly. Perhaps Mercer's half of the conversation was simply a ruse to fool the boy's mother into thinking that everything was going well with her son. Maybe the majority of the instructions to the passengers were like that and most of the pods had been unable to take up their proper pre-burn attitude and would never reach the rendezvous point. Not everyone was as well-informed as Corrie, after all, and even he could not be absolutely sure that he had done the job properly.

Corrie tried to bend his mind on to a more pleasant line of thought, an almost impossible task with Mercer's voice dinning in his ear every few minutes. If he could not close his ears at least he could look out of this hot, stinking hell at the cold, clear beauty of the stars. But the transparent plastic was smeared with condensation in several places—the first time he had known that to happen—and the only heavenly body he could see clearly was that of his wife.

VIEWED objectively it was not a heavenly body in any sense of the word, but then Corrie had been unable to regard it objectively in the thirty years he had known it. In the beginning, when it had been rounded and firm and very much younger, he had loved it so much that it had been impossible for him to feel any objectivity about it and when the years began to pass and the structure changed and thickened as it adapted to the changes brought about by childbirth, he had not wanted to be objective. Neither could he be objective when the muscle tone began to diminish and his heavenly body had begun to sag and wrinkle and grow lined under the triple forces of age, gravity and grief.

He thought of their daughter on the way to that dance, impaled like a beautiful butterfly on the steering column of her car—and decided that it was much more pleasant to

think about his wife and their current predicament. He had gone after, and gained, a very important post on Ganymede Base so that his wife would be able, if not to forget, at least not to be constantly reminded by well-meaning friends of the tragedy. She would keep herself busy teaching in a technologically advanced village school with a dome over it, and the prospect had already made her begin to relax. The absence of gravity had smoothed out a lot of her wrinkles as well and she was certainly looking much better than she had for years.

Corrie reached out to touch her, then stopped. It was not simply that putting his hot, moist hand on her would be uncomfortable for her and cut down the area of evaporation—there had always been this hesitancy about the first touch, the initial invasion of privacy. From the very beginning there had been this shyness about their wanting each other and an awkwardness about expressing their feelings —as if some hypothetical listener would make scathing remarks if they called each other by pet names. And so what had started as a joke to cover his shyness had gradually became for them the language of love.

Like a dedicated astronomer taking up a lifelong study specialty, he had made a close study of his heavenly body until he knew it thoroughly inside and out, knew its powers of attraction and the serious perturbations it caused when, as frequently happened, it made a very close approach and variations of the two-body problem had to be worked out. But no matter what he did or how coldly scientific was his language at the time, the result was invariably the same--two close binaries going nova together with the release of considerable energy and heat.

"Heat," he whispered angrily, "is the newest four-letter word."

She opened her eyes and saw his hand a few inches from her face. Suddenly she gripped it and pulled him toward her. They bounced softly together and she wrapped her arms tightly around his back before she spoke.

"I'm hot and sticky and not nice for you," she whispered between gasps for breath. "I'm bothering you and it isn't fair, but I'm afraid. I can't breathe, George. I'm—I think I'm going to die."

"Don't cry," Corrie whispered, smiling, "you'll increase the humidity. And you aren't bothering me—it's too damned hot to be bothered."

"It isn't a joke," she said, desperation making her speak the first few words aloud, "I'm suffocating. Every time I breathe out I don't know if I'll be able to breathe in again. I can't stand it. My head is bursting and—and I'm drowning in here. I'm going to die, George."

"No you won't," said Corrie quietly. "Try to think of something pleasant, like that time I stuffed the snowball down your neck. The heat is bad, but the suffocating sensation is all in your mind. We have plenty of air, remember—think of what it must be like in a pod with three or four people in it."

He broke off, gasping for breath

and with big black splotches jerking across his field of vision. It had been too much to say in one breath, but he had tried to do it because it had seemed the best way of proving to her that they were not short of air.

A little later he went on, "Mercer has been talking to Pod Sixteen and nobody else for the past twenty minutes, so he will soon be finished. When he stops talking we can get some sleep. Try to relax. We have nothing to worry about and plenty of air."

"THANK you, Sixteen. That completes the exercise, ladies and gentlemen. We shall meet again at the rendezvous area in approximately six and a half days."

We hope, thought Corrie, then said out loud, "Why don't you shut up and go to sleep?"

"That was good advice, whoever it was who gave it. I agree, all of you try to sleep. With one exception. Come in, Pod Four."

Startled, Corrie said, "Pod Four."

"We have been considering the incident—the only one of its kind to be reported—you mentioned during retro fire when your pod became uniformly deformed while thrust was being applied. We think you have a problem, Four. We are pretty sure that you have been punctured by one or more small particles of the ship and that you have suffered a drastic, but obviously not lethal, pressure drop. The drop has been so gradual that you may have attributed your difficulty in breathing to the heat, but the sooner you repair the leak or leaks the better.

"You will find a tube of sealing compound, clearly marked, in a recess in the services panel. If you can't read or understand the instructions for any reason—anoxia, impairment of vision, anything like that—ask me. Otherwise do not waste time or oxygen acknowledging my instructions.

"The punctures in the transparent section of your pod will appear as patches of condensation. Closer examination will show that they are actually small clouds of water vapor boiling off into space. Punctures in the opaque area will be harder to find. Use empty food tubes, torn open and flattened. Cover the opaque area systematically, using the opened tubes. The tube plastic is thin and will stick to any point where air is escaping.

"Don't try to take a short cut by covering a larger area with a piece torn from a plastic screen. You could easily miss a leak that way and the screen plastic is tough—you must avoid wasting energy when the oxygen level is low or you will pass out. Work carefully and thoroughly and with minimum effort. If you haven't asphyxiated already there should be ample time to plug the leaks before you do and then, of course, you won't."

Corrie was busy long before Mercer had finished talking and he did not have to ask for clarification or further instructions. He spoke only briefly to give directions to his wife and, although they used minimum effort on the job, they completed it, feeling that they had been boiled in their own body

fluids. Corrie looked at their handiwork, six small blobs of sealing compound where three tiny pieces of *Eurydice* had come and gone and wondered what it would have been like to have been hit by one of those tiny, radioactive bullets. One of them, if he remembered his position correctly when the explosion had occurred, must have passed within inches of his head.

"Pod Four," he said. "Finished."

"Thank you, Four. Pressure will come up fairly quickly now, but I'm afraid the news isn't all good. You have lost a lot of air and no longer have the fifty percent safety margin you started with. You are in the same fix as the people in three-passenger pods. But don't worry about it. Rest and sleep as much as possible. And that goes for everyone."

Corrie drifted, eyes closed and feeling fractionally more comfortable than he had felt for days, thinking about Mercer. The medic had known for hours that Pod Four was leaking air—the pause when Corrie had complained about the sudden flexibility of the walls during thrust had been Mercer reporting to the other officers, no doubt. But he had not mentioned it to Corrie until the very end, after the pods carrying four and then three people had been turned around—the pods that would reach the rendezvous very short of air indeed. If they got out of this, Corrie did not know whether he should compliment Mercer or punch his face.

"The next time you tell me you're dying, dear," he said, "I'll believe you."

The voice of Mercer kept him from hearing his wife's reply.

"Your attention, ladies and gentlemen. The radio interference caused by the ship blowup is beginning to fade and we have had a signal from *Eurydice* Control. The recovery ship took off three hours ago. It is on course and estimated to arrive at the pickup point in a little over a week. Now I'm going to sleep."

XVII

HE WAS monitoring the pod frequency with the volume turned down and all he could hear was the faint hiss of interference and, very occasionally, a quiet voice complaining about the heat, the smell, the hunger or the other people in the pod. If something happened in the survival capsules that needed his attention, the quality and tone of the voices would change enough to worry his subconscious into waking him up. Mercer had never felt so tired in all the thirty-two years of his life.

But his fatigue was mental rather than physical—the only muscles that he had used had been those controlling his tongue—and his brain did not have enough sense to go to sleep easily. He had to go through it compartment by compartment, switching off, powering down, forbidding it to worry or feel guilty or responsible for situations and people over which he had little influence and no direct control. And he, too, had to try to forget the heat and the hunger when it was within his power to ease both

conditions where he personally was concerned.

Prescott, without actually forbidding him to use the individual air-conditioning systems and stores for the bunks, had reminded him that he would need to save as much power and consumables as possible for the transfer of passengers to the recovery ship.

He tried not to worry about what might happen at the rendezvous—if his segment reached it or if the recovery ship reached it. There was nothing he could do for the captain either—Collingwood's treatment was palliative rather than curative. Nor could he be of any real help to the passengers, save as an eavesdropper who could head off a panic or a potential fight by giving the offending parties something else to think about. Except for the Mathewsons, Stone and Miss Moore they were simply names and voices to him for the most part—he had not had enough time to fix them in his memory as individuals.

As Mercer drifted loosely above his couch, the soporific hiss of interference and the occasional murmuring of passengers' voices reinforcing the humming of his segment's life-support equipment, it became increasingly difficult for him to separate the real sounds from the ones he dreamed and almost impossible to tell them apart when his dreams began to use real sound effects. But he could recognize the voices, even when they were slurred with fatigue, distorted by anger or segmented and separated by long, gasping pauses for breath.

The remembered voice of Prescott built itself up from the background noises, telling him that the passengers could not possibly be as short of air as they sounded—not even the ones who were four to a pod—and that the gaspings were due to unnecessary exertion, heat and thinking too much about a shortage of air that had not yet happened. That, of course, had been before Mercer had reported the deformation of Pod Four during thrust and Prescott had decided that the Corries' shortage of breath was actual rather than imagined.

Mercer had wanted to tell Four's occupants as soon as possible about their trouble. Prescott had objected, saying that doing so would unsettle the passengers who had not been turned around by delaying their retro fire and making them wonder if their own pods were not just a little bit soft. Telling the Corries too soon could quite easily have brought on another six emergencies just like theirs. When Mercer had continued to argue, Prescott had ended by asking him to wake the captain for a second opinion.

"No," said Mercer, because the captain, dressed only in sweat-soaked bandages, was feeling his way around the segment. Where Collingwood's spacesuit had not pressed tightly against his skin, the decompression had caused capillary bleeding and the blood had congealed so that his face and neck were like one great, livid bruise and the same angry discoloration marched along his body and limbs in broad, regular

bands. He kept looking straight at Mercer with his eye bandages and smiling and asking for a report and offering to help.

Mercer said, "No," again because it did not much matter what he said to the captain in a dream. He told Collingwood that he could do nothing to help if he could not see, because Mercer's greatest fear was that he had misdirected the segment so that they would never make rendezvous and that the captain's instructions and those of Prescott would probably be in conflict. In any case the captain was a patient, and doctors were not supposed to worry patients with their physicians' personal troubles.

The captain replied that he was dying from radiation poisoning even though neither of them would admit it while they were awake, that he was so full of sedatives that he was walking in someone else's sleep, and didn't Mercer want company? Mercer insisted that the captain would make worse even his dream condition by moving around and talking, that the radioactive material he had inhaled could easily be dislodged and start burning another area of lung tissue.

But the captain remained hanging there, talking politely and refusing to return to the bunk, which he could not possibly have escaped from in the first place. Mercer wondered if he could dream Collingwood back into the bunk or if he would have to dream himself awake and push Collingwood into the thing. But if he dreamed himself awake he might really awaken.

Mercer did not want to wake for as long as possible. Sleep was infinitely precious—it short-circuited a few of the boring, anxious, sweating hours of waiting for rendezvous and rescue or for the realization that he was off-course with no hope of rescue. He would allow the captain into his dream provided Collingwood did not become too unpleasant—it would be a small enough price to pay for sleep. But he could not help wishing that his dream did not take over where his waking life left off.

GRADUALLY Collingwood's intent, bandaged face began to fade away as did the bunks and the segment structure behind it, and Mercer was hanging in a vacuum rimmed by stars. Voices were coming at him from a ring of tiny, plastic globes that hung like bubbles in a black ocean.

I can't. You know I never could sleep properly without you beside me—no, George, you're too hot. Just—just hold my hand until I'm asleep.

Your tiny hand is sweating, let me—

You can't sing, George, and you're wasting oxygen . . .

"I agree," murmured Mercer, "on both counts."

It's supposed to be cold and dark, they told us. But this is a black inferno. I keep wanting to tear a hole in the plastic and climb out —it would be worth asphyxiating just to be cool for a few seconds.

Take it easy, Sampson. If you did that you wouldn't even have

time to feel cool. You would decompress, swell up and burst like a balloon stuffed with porridge. You wouldn't look or feel nice.

And you only have to look at Kirk herself to see what she means about overstuffed—

There's no need for cracks like that, Moore—I was simply trying to keep her from killing herself and us into the bargain. But maybe you would like to die, too, because you have nothing left to live for. Even when you nudge against Eglin he just pushes you away now. You must be getting desperate. Your cheekbones stick out and as for your gorgeous figure, we can count every rib. You're skinny, Moore, and you can't take it. That's the trouble with beautiful and unstable creatures who live only for love—

Listen, fatso, an overweight hog like you has no reason to talk about psychological instability. You're not exactly an attractive sight yourself. You've three times more skin than you need and it flaps around like a—

You bitch. You can't leave me alone, can you? Well, just remember that three can live and breathe more easily than four and the next time you're drifting about trying to nudge Eglin and you come near me, I'll—

Shut up, all of you! You're wasting air, and just getting angry generates physical heat, so cut out the squabbling, ladies. If you want to do things, lie quiet and think about doing them when we get back on the recovery ship, where there will be enough food and cool, clean air to let us do them without killing ourselves, right? If you think about it quietly you will let me go to sleep and dream about it. You might even go to sleep yourselves. As for you, miss, I don't really believe that you would tear a hole in the skin, but your long nails worry me. Why don't you chew them like I do? It's a good way of augmenting your diet.

"Sensible man," said Mercer. "Always leave them laughing." He wondered sleepily if biting the nails were a mild form of cannibalism.

Eh-eh-eh-eh-eh-eh. Whi-i-n-n-g-g-g. Blam-blam-blam. Kerpow. Eh-eh-eh- bo-o-om. Charge!

The Mathewson boy's capsule was having another war. It did not sound like Indians this time or bug-eyed monsters—arrows, Mercer knew from recent experience, went *whizz-thunk* and rayguns simply hissed. This sounded like a group of assault commandos of Second World War vintage in the process of establishing a bridgehead on Pod Fourteen. Mercer did not object either to the noise or the occupation, because it was much better than listening to the boy trying not to cry for his mother and the visitors were not using up any of the food or oxygen. Besides, a battle of this magnitude would soon make Mathewson hoarse and the imaginative effort involved would put him to sleep.

He hasn't spoken for over four hours. Do you think our radio has packed in?

You worry too much, Saddler. He's probably sleeping. After all, he's only human . . .

You don't really believe that, do you? I wonder where they found such a cold, unflappable, unemotional iceberg for a medical officer—

Poker, anyone? Whist?

We just finished a game. Can't you think of anything else, like what it would be like if we had a girl in here?

We might not be able to do anything. I mean, that's a game that only two should play.

Not always. It has been practiced as a group exercise on occasion.

No dice, Saddler—Mercer would deliver a sermon much stronger than the one he gave somebody three days ago, warning us about abusing the energy reserves of our restricted world in the thoughtless pursuit of pleasure. And the doll herself would probably remind us that she had a husband—seven feet tall and broad in proportion—in another pod.

But nobody could actually stop us, could they? I'm thinking about that paragraph on page twenty-three of the emergency instructions where it says, in effect, that any actions taken by survivors while adrift in a capsule are beyond the jurisdiction of any planetary government. We could get away with anything . . .

Like cheating at cards?

Don't be ridiculous—some sins are unforgivable. But he might be right, Saddler—we could be luckier than some of the others. A pack of cards doesn't use oxygen and if things get really bad we can always eat them.

Gin rummy, then?

"Try patience," said Mercer in his sleep. "That's the name of this game."

I don't dislike either of you. Try to believe that and stop arguing over what I probably think about you—I'm thinking none of those things. It doesn't make any difference to me that one of you is fat and the other thin—even less that one is polite and apparently thoughtful while the other is less so. I'm a PC widow with a wide experience of being loved, hated, tolerated or ignored by a man who changed personalities at will. The only good thing about you two, as far as I'm concerned, is that neither of you change.

That might not always hold true, ma'am. In the grip of strong emotion, such as love, even the most stable personality can undergo—

Say what you mean, Stone, Given the chance you would be as much an animal as any other man.

That kind of personality change is normal in those circumstances and doesn't worry me.

I should think not. My wife wouldn't complain if I came home a different man every night. What happened to him, was he institutionalized or did he get airborne without an aeroplane?

Shut up, Kirk . . .

It doesn't matter. You probably think it was fun. It was, in the beginning when he took PC only occasionally when he had to meet an important client and he thought it would help him swing the deal if he put on a complimentary personality. But then he started taking them more and more often—and experimenting—and for the last four years his personality

was so fragmented that it had made him impotent. But he kept taking more, several different kinds at once, trying to shock his mind back to normal. They told him that it didn't work like that but he wouldn't believe them. That was how he died. At a party—after taking five, one of which was a hallucinogen—it was that kind of party. But he didn't commit suicide. Three of them got impatient to experience the drug under free-fall conditions. They were holding on to each other all the way to the pavement.

Tough . . .

Yes, indeed . . .

It doesn't bother me now. But you see why I don't like or dislike either of you and why it is a waste of time fighting over me. Nothing could happen here anyway, but perhaps if I came to know both of you better on the ship—

Stone might get to know you better on the ship, but I wouldn't—my wife would be there. And I'm not all that sure that we'll ever make the ship. That sanctimonious medic is conning us and you are likely to be the last woman I will ever meet. My personality isn't very nice, but I'm likely to be the last man you will ever meet. For obvious reasons I'm discounting Stone, who probably couldn't—

Kirk, you're trying to start a fight again and you'll get it—on the recovery ship if I can wait that long—

Please. Please don't fight—

"MacARDLE," said Mercer urgently, "Neilson. Prescott. Wake up, MacArdle, and listen to me. I have to try something but I need your help . . ." He went on calling the communications officer, outlining what he had to do and asking for instructions. But MacArdle did not answer and all he could see was the survival pod with Mrs. Mathewson and Stone in it with a great, organic zeppelin without a face—Kirk. But then the picture began to fade and the supports of the bunk beside him began to show through. Something, somebody, was waking him up and he was actually glad.

"—and if you insist on babbling in your sleep, at least talk coherently! Mercer! Prescott here. Come in, Mercer."

"Mercer."

"I think I caught the general drift, but tell me again what you want MacArdle to do and why."

Mercer began by explaining that he still wasn't sure whether he had overheard some pod conversations or merely dreamed that he had. When Prescott curtly informed him that he had overheard the same conversations, Mercer came fully alert.

Without giving Prescott a chance to speak again he concluded, "—I've been listening to them and understand the type of personalities involved. With that background of PC trouble with her husband she can't help feeling the way she does, but the other two should not, under those circumstances, be told that she has no strong feelings either way for them. If she said that she preferred one, fine—they might have a token scrap and some bad language. They might even injure each other while proving

who was the better man. But telling them that they are just the same in her eyes—well, they both have to prove to her as well as to themselves that they are not the same and before they do I have to get over there and stop it—"

"Negative. Absolutely not. The segments and pods are all, we hope, heading for rendezvous. Making course corrections to bring your segment alongside Three is a much too complex operation at this stage."

"But MacArdle had the return courses ready as soon as we needed them. He must have a computer that could easily—"

"You've got one just like it, Mercer, but you've spent your life programing it with medical data. The answer is no."

"But they'll kill each other."

"Talk them out of it, Mercer. There is nothing else you can do."

XVIII

HIS trouble was that he could not talk to the passengers as individuals even though, on many occasions during the days that followed, he was sorely tempted to do so.

On Pod Three it was Mrs. Mathewson who did most of the talking as she tried desperately to keep the peace. He learned much about her from the things she said —about the life she had so recently led, the pressures she had been under and the difficulties of bringing up her son in a home that was all too often a madhouse. Other survivors revealed things good and bad about themselves, but Mercer's interests in them and his concern for their welfare was professional—Mrs. Mathewson and her boy he was beginning to like. If he wasn't very careful he could find himself acquiring a readymade family.

The thought was ridiculous, if pleasant. It seemed to come to his mind more often when he was asleep than at other times—and on some of those occasions he was able to do much more than talk to Kirk and Stone. One of the first things he usually did was forget his Hippocratic Oath, lose his temper and begin making medical repair work for himself.

He had to remind himself that Mrs. Mathewson and her companions were three reasonably normal, civilized people who would not have dreamed of hurting each other under ordinary circumstances. The trouble was that he could not talk to them directly, although it might have been done quite easily by calling for silence from everyone else and talking frankly about their situation. But then he would remember that while the frank discussion was going on between the occupants of Pod Three and himself, everyone else would be listening to his half of the discussion—including the Mathewson boy and Kirk's wife. Mercer did not want the boy to hear about the sort of things Kirk was saying to Mrs. Mathewson and the discussion might easily become the cause of violence in Pod Four as well. The trouble in Pod Three, like a virulent disease, had to be contained.

So he talked to Three in general terms, telling cautionary tales, drawing comparisons between pod

conditions and those on overcrowded Earth, stressing the importance of self-control and the necessity for eking out the available resources for as long as possible. When the reactions from the pods —not just from Three—told him that he was beginning to anger them with his preaching he changed his approach. He began to talk psychology and discuss the well-known fact that individual members of certain species, when threatened with death or a lesser danger, sometimes displayed a tendency to seek to prolong their lives through their offspring either by protecting them against the danger or by seeking to produce more of them. This urge toward species immortality was an animal instinct that reasoning beings could easily overcome.

From that he moved to debating. More accurately, he answered at length questions that had never been asked. The survivors could not hear anything but his side of the debate so they did not know who asked the questions Mercer was answering and when some of them asked good questions of their own he sometimes tried to answer those, too. But when the questions were difficult or potentially unsettling he pretended that too many people were talking at once and that he had not heard them.

He knew from their reactions that most of them guessed he was getting at someone, and speculation regarding the identity of the unknown offenders grew rife. Pod Three knew whom Mercer was getting at, but Kirk and Stone had stopped talking to him or even cursing him. And Mrs. Mathewson seemed to realize that nothing Mercer could say at a distance of several hunred miles would be able to help her.

That made two of them.

"Some of the passengers consider me a nuisance," he told Prescott during his next report, "others a constant irritant and a bore, while most of them show active dislike. But on Pod Three—well, everything I say now makes them angry with me and each other—the men that is. There's going to be bloody murder in that pod if someone doesn't make them see sense. Do you think you, as the most senior officer, could talk to them and—"

"I know I couldn't, Mercer. Nor could Neilson or MacArdle. We aren't programed for that sort of thing. How is the captain?"

"Still out. If I allowed him to regain full consciousness he would be confused—I'd have to explain everything that has happened in detail to him—and in considerable pain. It would not be fair to him and he might not be well enough to sound authoritative. But then, I don't seem to be effective either, and the reactions of the other passengers—"

"Are you worried by what they think of you, Mercer? Don't be. I've listened to some of the things they've called you—several varieties of sanctimonious unprintable, a blasted nag where conservation is concerned, a cold-blooded, imperturbable zombie who apparently can't even treat a boy with kindness. But why go on. I'm beginning to feel proud of you, Mercer."

"Thank you, I think."

"However, I can help by giving your people something else to think about. MacArdle has computed the attitudes for the rendezvous retro burn, but it will involve your giving the passengers another lecture. I'll give you the positions, marker stars and firing times in numerical order, beginning with your own, which will be first. Are you ready to copy?"

"Ready," said Mercer.

"Before I give you the data explain to them in your words, not mine, that for this burn the attitude is not as important as the timing. They must check their velocity as close as possible to the rendezvous point and if they make a small error in attitude it will cause only a correspondingly small lateral drift and we will be able to keep them in sight and pick them up when the recovery ship arrives—that is, of course, assuming that they have not made a major attitude error which will take them wide of the recovery area. If they burn their B thrusters too soon or too late they will stop short or overshoot and we may not be able to find them without the recovery ship's radar—and by then their air could be gone. Do you want me to repeat this?"

"No."

"The first burn, yours, will take place in a little over five hours. The two four-person pods will follow, then the remainder in numerical order, with the last few having nearly a day to practice their positioning maneuvers. With luck a fair number of pods will be converging toward visual contact shortly, which should also give your people something pleasant to think about.

"Your burn will occur at twenty-two zero six and your marker stars are . . ."

DURING the hours that passed before Mercer had to make his burn, the reactions from the pods ran the gamut from wild excitement to the listlessness of utter despair. But morale improved considerably when Pods Ten and Twelve reported seeing another pod, which meant that they were seeing each other. Mercer did not tell them that their seeing each other so soon meant that one or the other was considerably off course.

When the time came for him to apply thrust he had not seen anyone else, even though the other three crew segments had reported seeing each other and they should have been within easy visual range of him. Mercer tried to consider the possibility that he was off course, lost, and for a few minutes so great was his panic that he could not even think. But then he began to feel angry as well as afraid, angry with MacArdle for giving him such precise instructions when, if Mercer had not carried out the repositioning properly a week earlier, this present exercise was a sheer waste of time. He surprised himself by making the final attitude check and pressing the thrust button precisely on the pip.

But when he moved to the canopy to make another desperate search of the stars for the three segments, the fear returned. He wondered again if he should rouse the captain—would it be fair to wake Collingwood only to explain that due to an

error on Mercer's part they were lost and were going to die? It might not be fair—but, on the other hand, did anyone have the right to put a man to sleep, then make the condition permanent without first waking him to tell him so? Maybe Collingwood would hate Mercer for waking him—or perhaps there were things Collingwood would want to remember for a while before he died. There was that startlingly beautiful ground hostess who was the captain's wife.

"Where the hell are you?" Mercer shouted.

"Prescott. Steady, Mercer. We could ask the same of you. Try lighting a flare."

Keeping his eyes covered to retain his night vision, Mercer ejected a flare, not daring to hope.

"We have you, Mercer. MacArdle says that from your position we should be midway between Triangulum and the Square of Pegasus, in visual range now that you know where to look. Well?"

"I see you," said Mercer after a few minutes. With thousands of stars all around him, the arrival of three small and not particularly bright additions had not been easy to detect. "Can I get closer?"

"Yes, by using your flares for thrust. You ignite them without pressing the eject button. This causes them to burn inside their launchers. Each will give ten seconds of very weak thrust. But it isn't necessary for you to come closer. We can expect some pretty wild shooting from the passengers and having you out there to look for stragglers could be an advantage and the recovery ship might come to rest closer to you than us."

"I understand."

"It's nice seeing you, Mercer. Now you had better attend to Pod Five."

On Pod Five Eglin had passed out from heatstroke and the three girls had positioned the capsule and applied thrust. Mercer did not see their burn, nor those of Pods One and Two, but they were spotted by the other segments and he relayed the good news to their occupants. Several passengers reported excitedly that they could see other pods, and Mercer spotted one drifting almost directly between himself and the dim constellation of artificial stars that was made up of the other three crew segments. He did not know who the new arrival was until its B thruster burned outward like a fiery spear precisely on the second listed for Pod Three.

"I see you, Three," said Mercer, laughing with relief. "Nice shooting."

"Stone here. I'm not just a pretty face, you know. But this little miracle of astrogation is going to cost someone, Mercer."

"Fine," said Mercer, laughing. "Company rules forbid the carrying of intoxicating liquor, but if you wouldn't mind a few ounces of diluted surgical spirits I'd be glad to—"

"He doesn't want to be paid off in booze, stupid."

"That was Kirk, Mercer. Ignore him. He isn't responsible for his glands."

"Don't you patronize me, you—you gentleman—"

"Please don't fight. We're nearly

safe now. Please. Doctor, talk to them."

THERE was nothing Mercer could say that would do any good, so he said nothing. There was little that he could do, but he did it.

"Prescott. Are you in trouble, Mercer? There is evidence of a discharge of gas from your vehicle."

"No, sir. I used two contained flares to move toward Pod Three."

"I told you to stay put."

"Yes, sir. But a very serious problem could arise on Three if something isn't done quickly, and it is in my province. I guessed that you might object and I decided that it would be better—less prejudicial to discipline that is—if I were to be chewed out for using my initiative rather than for disobeying orders."

"That was considerate of you, Mercer. I suppose you consider mutiny just another exercise of individual initiative? Don't answer—I'm too busy just now to listen. Neilson will tell you what to do if you ever get where you're going."

Before Prescott switched off Mercer could hear MacArdle reading out the numbers for what he called his final approximation of position while another voice, sibilant with distance and intervening interference, was reminding Prescott that the survival pods were nearing their limit of duration and suggesting ways by which the passengers could save energy and air. The voice from Earth was speaking as if it were surrounded by mikes and TV cameras, as was probably the case. Mercer hoped that Prescott would give the ground-bound medic instructions on what to do with his elementary and unoriginal suggestions.

The flares had not given his segment much of a push. It would take five hours for him to reach Pod Three—if he did not go wide. He had three flares left, two for deceleration and one to light if he got lost. It was extremely difficult to listen to the sounds from Pod Three without thinking too much about what might be happening there, but he tried. The voices from the other pods helped.

"Pod Four, Corrie, at rest. I have two others in sight."

"I can see someone! Pod Six here. Shouldn't we decelerate?"

"Pod Seven. We can see a pod on a converging course. Who is it?"

"Mercer, the air is bad. When I look at the stars I keep seeing blotches. I'm not sure they're the right ones."

"Pod Five. Sampson. The others have passed out and—and I'm going the same way. The air indicator is as—as near zero as makes no difference. Where the—hell's the—recovery ship?"

"Prescott. I heard that, Mercer. Tell her there is a safety reserve and to relax. Make it sound convincing. I'm going after them myself, estimating contact in five and a half hours. Is there anything special I should remember about reviving heatstroke and asphyxiation cases?"

"I can't breathe, George."

"Crowded all of a sudden, isn't it? I can see three of them, all drifting past us. It's like—oh, God, no. We're moving past them—we're going right past them. Saddler here. What's happening to us?"

"Prescott. I see them, Mercer.

Their attitude was badly off—they killed only a fraction of their inward velocity and are shooting away from the rendezvous area at a fair clip. MacArdle, go after them before they get too far away. Mercer, tell them to relax and play some more poker."

"Pod Fourteen, Mathewson. When will I be able to see something, Mercer?"

"Pod Nine here. We're due to decelerate soon but we still can't see anyone. Are—are we lost?"

"I don't think I'm the sort of man he keeps telling you I am—I'm pretty sure I'm not. But I don't know for sure and I don't want to hurt you. Even under this blubber I'm a big man, you know, and—well you've heard the expression: laugh and grow fat. I think that fat people have to laugh to keep from crying or breaking things, and small people keep jumping about and prodding people so's everyone will know they're there—"

"Watch it, Kirk."

"—in noise what they lack in size. But they're lucky in some ways. They are better engineered, less susceptible to component failure like bad hearts and gummed-up arteries and there are always plenty of small, good-looking women for them. Unless you've plenty of money or you put on weight after you're married nobody will look at you but fat women. Just once before I die I would like to be loved by a beautiful slim girl with a nice disposition and—well you know."

"I understand, Mr. Kirk. But we aren't going to die and that wasn't—isn't how I'd describe myself. I'm a bag of skin and bones."

"Ignore him, ma'am. On you skin and bones look good."

"Damn you, Stone. You always have to say the right thing."

"Kirk, what are you doing—"

The fight started then and Mercer would not reach them for another three and a half hours.

XIX

HE BEGAN by telling himself that it could not possibly last, that they could not maintain the physical effort in an environment of a stinking plastic oven full of rank air—but the fight went on and on with no audible indication of it's ever stopping. Then he began to worry about the heat they were generating and the air they were using. Reminding himself that both men were suffering from malnutrition and could well be as weak as kittens did not help much, because the noises they were making suggested that they were fighting like tigers. What they were doing was a physical impossibility for sane men and insanity like theirs had to be temporary.

But temporary did not necessarily mean of short duration.

The grunts and gasps, the low, monotonous cursing and the wet thud of fists or feet against slippery, sweating flesh went on. Mercer told himself that his imagination was probably working overtime, that they were not seriously injuring each other because in the weightless condition it was practically impossible to kick or punch accurately and, if a blow should land, both attacker and victim

would bounce away unless they were holding each other tightly—and if they were doing so they would not be able to punch or kick effectively.

There was a sudden high, sharp squeal of pain.

"Stop it! Stop it! Look what you've done to his ear—"

Animal noises answered her. Probably they were making them at each other. But there were other times when the noises became coherent words, when between the curses and grunts of pain they became all too specific about what they were going to do—what they *were* doing—to each other. So there were very few blank areas in the mental picture Mercer had of the interior of Three and those were usually filled by the anguished pleading of Mrs. Mathewson trying to keep the two men from killing each other and her as well.

"It's getting hotter! Stop it. Please stop it—"

Mercer heard another wet thud and a feminine cry as Mrs. Mathewson tried vainly to separate the men. Another scream was followed by a continuous whimpering and moaning as one of the men sank his teeth into the other's shoulder and had his eye clawed while he was tearing free. Mercer knew what was happening because they kept talking and gloating about it, but he did not know who was doing what because neither man's voice was recognizable.

Mercer had forgotten that in the weightless condition they could still use fingers and teeth.

"Pod Ten. I'm having trouble again finding my markers. Is Arcturus supposed to be level with the rod equator and Antares ten degrees above it—or have I got it the wrong way around?"

"You have fifty minutes before your burn, Ten," said Mercer sharply. "I'll come back to you. Quiet, everyone, for Pod Three."

"Prescott. Forget Three, Mercer, and think about your other passengers. Give Ten the information he needs. Right now."

"But those two are killing each other and probably the girl, too. Listen to them."

"I'm trying not to, Mercer. I advise you to do the same."

Mercer could not forget Pod Three because the sounds on the capsule frequency kept reminding him that the biting and clawing and gouging were still going on. But suddenly there was a marked reduction in the noise and activity—maybe the heat was getting to them at last and they were beginning to flag. With luck they might both pass out from heatstroke and stop using so much of the pod's air—all the occupants might then survive, even if two of them did not deserve to.

A little over two hours were left before he rendezvoused with Three—if he were able to do so.

"You've won, you've won. Let go of him. Can't you see you're strangling him?"

"I've won. No. And yes."

"But—but you're not angry any more and you're still trying to kill him. Let go. Let go of his throat."

"Keep away. I'll wrestle with you later—"

"Let go of him. Please let go—oh, my hair, my hair—"

"I told you to keep away—"

Listening helplessly, Mercer knew that things were quieter on Three because one of its occupants was dead or unconscious. He could hear heavy breathing and the thud of blows being struck. Reminding himself that it was virtually impossible to land heavy blows in the weightless condition did no good, because he was remembering the girl's long, dark hair and imagining one fist gripping a handful of it while the other pounded her into insensibility.

"Pod Ten. Retro thrust completed and I can see two other pods. I think one of them is close enough to wave to."

"Save your energy," said Mercer dully."

THE sounds from Three were taking on a new quality because the purpose of the man making them had changed. His world might only have minutes of life left to it and he, whichever of the two it was, intended enjoying them to the full —the gasping, chopped-up monologue made that all too plain. But his intentions, which would have been easily accomplished on Earth where gravity kept inanimate or unconscious objects in one place, in his present environment required the active cooperation of both parties. One of the parties was unconscious and could not have cooperated even if she had wanted to and he was becoming angrier, hotter and more frustrated by the second.

Suddenly his breathing became stertorous. The sounds of cursing and the slapping contact of his body against the plastic stopped. He began to make choking noises and a few seconds later he was making no sound at all.

Mercer swore horribly and turned up the volume on the pod frequency. The segment was suddenly filled the sounds of heavy, labored, gasping breathing. It was coming from the fourteen other survival capsules and not, he was afraid, from Pod Three.

"Prescott. I heard that, Mercer. You might be better advised to divert to Pod Four. The Corries could be shorter of air than they realize. MacArdle will give you the figures. Neilson will meet you and come aboard at Four—we'll need to make some fast pickups by then and for that we need fast and fancy maneuvering."

"I have to check Three."

"I see. In that case MacArdle wants you to observe your target pod carefully and note the rate of apparent drift in the stars beyond it. This will tell him how much you are off course and allow him to compute an angle of thrust that will compensate for it during deceleration. Neilson will give you a rundown on the automatic docking sequence."

"I'm listening," said Mercer.

"When they've finished you should check on the captain's condition—if you haven't already done so. You are going to be very busy for the next ten hours."

"Will do."

But all at once Mercer did not want to check on Three's drift, nor did he want to see the proof of the things he had heard going on, even though the sight might not be as

bad as his imagination had pictured it. Pod Three was in all probability a coffin that would never be opened —it might drift in space for all eternity, beyond even the range of Gabriel's trumpet, unless he himself went in and disordered the bones of its freshly dead.

There was no real need for him to open that stinking, plastic coffin. The air must have been used up during that long, vicious fight and a man who had killed once by strangling his victim might lack the imagination during a stress situation to vary his methods of coercion. Mrs. Mathewson could well have been dead before her attacker had succumbed to heat and asphyxiation.

Mercer had been no stranger to the sight of death, whether naturally occurring or violent, but he was most desperately anxious not to see Mrs. Mathewson dead. For the first time he was able to understand why some people refused to look at the bodies of their nearest and dearest relatives. If one remembered loved ones only as they were when they were alive, there was no real proof that their lives had ended.

He could still call Prescott and change his mind. But then there was the boy to think about. Young Mathewson might not be as good at playing spaceman as he sounded. He might be headed wide of the rendezvous point and already condemned to die. But he might not die—Mercer might have to tell him that his mother had died and he realized that, no matter how bad it was going to make him feel a few hours from now, he had to be able to tell the boy that she had died before he reached her pod.

While MacArdle gave him instructions he checked on the captain's condition and made sure that the services in the other bunks were functioning. Then Neilson's voice filled the segment, interrupted only by passengers saying that they could see other pods and their air was running out, that it was very hot and when would the recovery ship arrive? People, Prescott included, were not giving Mercer much time to think, for which he was glad.

As his segment was closing with Three he wondered what he would do if there were a survivor in the pod who was not the girl. He knew what he wanted to do, but a rebel bunch of brain cells in his mind—a minority group, but one that was steadily gaining converts—kept insisting that in different circumstances Three's occupants might well have become good friends. That the disaster of *Eurydice* had subjected two flawed personalities to a breaking strain and that an innocent one who had given no indication of being flawed had perished in the total calamity.

WITH MacArdle's help he found himself less that twenty yards from Pod Three and drifting slowly past it. Mercer had an air bottle and mask strapped in position, another set drifting loosely at his elbow and the inside seal of the airlock was already open. Through the window in the outer seal he could see Three turning slowly end over end like a great, fat cucumber, half silvered and

half clear. In the transparent section he could see a motionless tangle of plastic screens, clothing, food containters and bodies floating like strange fish in a pink-tinged, frozen ocean.

When Three's lock turned to face his position he launched the automatic docking cable, watching its seeking head home on the lock transmitter, connect and begin drawing the two vehicles together. As the cable shortened the difference in the two vehicles' velocity set them spinning about a common center. By the time the lock interfaces came together they were spinning quite fast—not enough to blur the stars, but enough for Mercer to feel the tugging of artificial gravity.

He checked that the passenger frequency was switched off and reported what was happening to Prescott. Then he opened the connecting seals and went through.

The centrifugal force was greater than he had expected so that he dropped not too lightly onto the services panel at the opposite end of the pod. It was covered with a sexless tangle of arms and legs and plastic debris, the whole mess splattered with sticky red discs of congealed blood, which a few minutes earlier had been drifting weightless in the incredibly hot and stinking air. The smell was forcing its way past his breathing mask so that he had to fight to keep from retching.

Mercer began pulling the tangle apart, trying to separate and identify the people. The sun whirled steadily around the pod, plunging its contents into darkness for a few seconds, then sending shadows crawling over the bodies.

Two, both male, were covered by thick traceries of nail marks. It was as if they had been wearing a red embroidered body stocking whose pattern included a large number of solid red flowers—the places where they had used their teeth on each other. Wet red patches showed on their scalps where hair had been pulled out—their ears were like raw meat and he doubted if one of them had been able to see at the end. Neither of the two men was sweating, nor did they bleed.

Mrs. Mathewson was also bloody but the blood did not seem to be her own. She was at the bottom of the heap, her head under a piece of plastic screen—which also covered the air supply outlet—in what would have been an effective oxygen tent if the air being vented had not been only fractionally less foul than that in the pod itself. There were two large bumps on the right side of her skull, no depressions, and the side of her face and upper torso showed severe bruising. She did not seem to be breathing but her pulse, weak and rapid, was discernible.

Mercer slipped the spare mask over her head and turned the air tap on full. He tried to inflate her lungs by moving her arms rhythmically away and back to her sides, but he had to be careful because she was so emaciated that he could actually see two cracked ribs. The pulse began to slow and stengthen although she showed no sign of regaining consciousness.

He was dizzy from a combination of the stench, the heat and sheer

relief. Quickly and carefully he strapped on her air tank, checked the mask fastenings and lifted her in his arms. He bent at the knees and jumped for the lock seal eight feet above his head.

The services panel gave under his feet. He found his mass not lined up properly with his center of thrust and began a slow somersault. Although the centrifugal force was weak, it was still strong enough to bring him to a stop three feet short of the seal and he began to fall back slowly. When he landed Mrs. Mathewson still in his arms, the pod stretched alarmingly. Its walls closed in and for an awful moment Mercer thought that the plastic would rupture and burst. But slowly the capsule resumed its proper shape. Mercer tried again.

This time he did not jump immediately but instead made a series of knee flexings which set the pod's floor to bouncing slowly in and out and its walls to pulsing like some alien artificial heart. He could hardly see through the sweat pouring into his eyes and he knew that if he gave in to the urge to be sick he would gum up his breathing mask and probably suffocate or collapse from heat prostration before he could get it cleared. So he persisted, reinforcing the up-and-down movement of the services panel until regular contractions threatened to bounce him away, then he jumped during one particularly strong upswing.

"The girl is all right," he reported, back in his segment. He hardly recognized his own voice.

"Good. I didn't really think that the air would last."

"It lasted," said Mercer, "because the other two had stopped using it."

"In that case leave them and mark the pod. Seal up and prepare to break contact. But before you do, MacArdle says he can utilize your present spin to boost you toward Neilson and Pod Four. It could save a lot of time and the Corries have very little time left. I am closing with Pod Five now and will be too busy to talk to you for a while, so I'll give you MacArdle—"

"Before you open the seal," said Mercer, "take two antinausea tablets and plug your nostrils with cotton."

"I'm supposed to be giving the orders."

"Doctor's orders," said Mercer firmly, "you have to take."

XX

ON THE way to the rendezvous with Neilson and Pod Four, Mercer had time to move Mrs. Mathewson into the bunk below the captain's, carry out a proper examination and tape her broken ribs. She still had not regained consciousness but the reason, he was sure, was nothing more serious than a concussion. While he worked the last few pods were nearing the rendezvous area, and his speaker kept repeating the occupants' complaints about the heat and shortage of air. Some of the passengers sounded close to desperation.

After his few minutes in Pod Three, Mercer wondered why they were not raving mad.

Suddenly the slow, deliberate voice of Neilson, relayed through Prescott's transmitter, was filling his segment.

"I'll be docking with you in a few minutes, Mercer, but don't open your seal until I tell you. The drill is that I push you close to Four, disengage, then let you reel them in as you did with Three. I'll position you so that you will not have to worry about spin. When you have them aboard dump the pod and I'll redock and join you. Got that?"

"It sounds almost too easy," said Mercer.

After one unpleasant surprise when he opened the seal—his ears popped painfully because Four's pressurization was dangerously low—it all went surprisingly easily. There was no centrifugal force to complicate the rescue, and the pod interior was uncluttered. Both of the Corries were barely conscious. It took only a few minutes to float them into the segment, toss a marker grenade with a five-minute delay into the pod, seal up and detach.

Neilson's segment moved in quickly, nudged the empty pod aside and locked on.

Mercer turned to see Mrs. Corrie taking off her breathing mask while her husband stared through the canopy at the slowly shrinking shape of their capsule. Corrie gave a startled grunt when the transparent section of the pod abruptly changed to a dazzling white.

"A small explosive charge inside a bulb of white paint," Mercer explained. "It marks the empty pods so that we will know to leave them alone. But you two will be much more comfortable in bunks—"

"No," said Mrs. Corrie, gripping her husband's arm with both hands.

"Excuse me." Mercer slipped them each a hefty shot of sedative. As their eyes began to lose focus he said, "There is nothing to be afraid of, ma'am, not now. The bunks are designed for seriously ill or injured passengers and carry their own life-support and waste elimination equipment. They are cool and roomy—"

"How roomy?" asked Corrie.

"If you are worrying about claustrophobia, don't. You will be asleep and—"

Neilson arrived just as Mercer had decided that he knew what was really worrying Mrs. Corrie. Neilson was wearing a shiny patina of sweat and his cap pulled well down over his eyes. Mercer greeted him briefly, wondering about the reason for the cap—then deciding that the visor probably shielded Neilson's eyes while he checked marker stars close to the sun.

He turned back to the Corries.

"I suppose you don't want to be separated after all you've been through," he said. "That is quite all right—the bunks are big enough to fit two in a pinch. But I'll have to increase the air supply."

Neilson made the necessary adjustments and helped Mercer fit the already sleeping couple into their bunk.

"I don't approve of single beds, either," Neilson said.

"Head to toe like that there isn't much risk of their suffocating unless one puts a foot in the other's mouth," said Mercer. "But I think

I'll leave the sides open and keep an eye on them anyway. It's nice to see you, Neilson."

"Likewise, Mercer."

"Prescott. Delay your reunion celebrations, please. MacArdle has some figures for you."

A few minutes later Neilson had instructions for Mercer.

"We have to reach Pods One and Nine as quickly as possible," he said, removing the cover of Mercer's thrust panel as he spoke, "and pushing you ahead of me will waste too much time. So I want you to apply thrust to your segment while I do the same with mine—that way we will approach the targets broadside but much faster. Ignore all the pretty lights unless they suddenly turn red. Depress this stud when I tell you—I'll give you a five-second countdown—and release it when I yell, 'Cut—' The procedure is the same as it was with Three when we close with the pods, which are only a short distance apart. First let me get us properly lined up."

"Two pods in trouble?" Mercer reached for the switch of the passenger transmitter. "That's six people—no, seven, because Ten has four aboard—and we do not have an unlimited number of empty bunks."

"Don't touch your transmitter, Mercer," said Neilson sharply. "Prescott has been monitoring that frequency while you were busy and I don't want anything to distract you until we're on our way. Anyhow, you have established a useful precedent with the Corries."

THE passengers in Pods One and Nine were in no condition to object to being packed in two to a bunk—they were much too relieved at being able to breathe relatively cool air again and for the few minutes it took for the sedative shots to take effect Mercer let them assume that such overcrowding was normal.

While he was dealing with them he could not help noticing the bunk temperature gauges—they showed the differential between the segment as a whole and that being experienced by his patients. The new arrivals were generating a lot of extra heat.

Before Neilson could rejoin Mercer, Prescott was on the speaker. MacArdle had more figures—Pod Six was running out of air.

Neilson estimated that he and Mercer would need twenty minutes to reach Six. While they were on their way Mercer asked about Pod Eight, which had accelerated past the rendezvous and been chased by MacArdle. He had been out of touch and nobody had mentioned Eight recently.

"That was quite a chase, Mercer. It will take me five hours to get back, but I have them aboard."

"Are they all right?"

"Two of them are doing fine. But the other man, Saddler, is running a bluff with a pair of threes."

"Prescott. When you've dealt with Six, there are two other pods, Ten and Thirteen, that will be in bad trouble by then. Give Neilson their markers, MacArdle, or would you rather watch the poker game?"

"How," whispered Mercer, "does he know which pods are in trouble?"

"He noted their positions as they

came in," said Neilson quietly, "and his telescope brings in the pods that went wide. From his position they have a wide angle of separation, so he lines up his directional antenna on the telescope bearing. This increases the strength of any given pod's signal and he knows who is calling for help even if they don't identify themselves—or even if they are so short of air that they can't speak."

"Do we have a dish antenna?" Mercer asked. "I was thinking that it might operate in reverse to allow me to speak to a pod without all the other pods hearing the message."

Neilson shook his head. "Only the captain's segment has such refinements and normally the dish is used to maintain two-way contact with Earth Control. But now Prescott is using it on the pod frequency because if Control and MacArdle haven't done their calculations right there isn't much point in wasting time talking to Earth with passengers in trouble only a few miles away."

"Suppose MacArdle or Control haven't—" began Mercer.

"This segment, on the other hand," Neilson went on firmly, "has no sophisticated communications equipment, a relatively small fuel reserve and quite a lot of power and air reserves—a life raft, Mercer, is what we're in."

"If I had known about the power," said Mercer, "I might have wasted a little keeping the place cooler."

"You will be very glad that you didn't," said Neilson seriously. "This segment takes thirteen passengers and a crew of two, comfortably. So far you've squeezed in ten passengers and have saved on space because most of them have doubled up. Trouble is, you can't double the air supply. Our segments have less elbow room and can take three survivors in a pinch. How Prescott is managing with four I shudder to think." Neilson paused. Then: "Why don't you take a few minutes to visit my place? It's through the airlock and then straight ahead. You can't miss it."

"Are you trying to be funny?" Mercer asked harshly. "Or trying to humor me so I won't ask awkward questions? Do you know when the recovery ship is due?"

"If I did I might not tell you. You would only worry if it turned out to be a little late."

"I'm not completely stupid. If it doesn't arrive exactly on time—that means it has gone wide and won't arrive at all. That is so, isn't it?"

Neilson did not reply. Instead he cocked his head to one side and said, "One of your patients wants out."

THE captain was tapping the inside of his bunk and growing audibly more impatient with every passing second. Mercer started to say that Collingwood had no business being awake at all, then stopped because he realized that he must have missed giving his patient a scheduled sedative shot. He moved quickly to the bunk, opened the side and slid the litter out far enough to let him see what Collingwood was doing.

Mercer had another shot ready, but it would take a few minutes for

it to take effect—and longer if Collingwood tried to fight it. Collingwood had stopped tapping and was using his fingers to explore the bandages covering his eyes.

He winced as the needle slid in, then asked sharply, "Who is that?"

"Mercer, sir."

Neilson drifted to the bunk, gave a little sigh of sympathy as he saw the bandages, the lead shielding on Collingwood's chest and side and the livid decompression blotches covering the captain's body. He withdrew again without speaking.

"I've lost count of the times that I have begun to come to," said the captain, "and you've jabbed me to sleep again. I want out of this thing, Mercer. Even if I can't see, I can still hear, speak and think, damn it. And I should be getting exercise to prevent muscle atrophy and . . . But you're the doctor and should know all about that."

"Yes, sir," said Mercer. "That has been attended to—you have been given gentle exercise and massage every four hours. But I strongly advise you to stay put, sir. Movement of any kind could aggravate your present condition."

"Which is?"

The shot was showing no sign of taking effect and Mercer knew that the captain was demanding a condition report with an urgency that might delay the sedative's action indefinitely. Through the canopy behind Neilson Mercer could see Pod Six growing slowly larger. He told the captain about his condition, keeping it brief and to the point.

"But you must have changed the dressings while I was sleeping," Collingwood said when he had finished. "And presumably the damage caused by the dim light is no greater when I am awake than asleep. I want to know if I can see, Doctor. And while you are taking off the dressings you can tell me about the condition of your segment, the other crew segments and the pods—"

He had other questions as well and there was still no sign of the sedative's taking effect.

Mercer looked appealingly at Neilson, who moved closer and began to answer the more technical questions as the last few layers of dressing were being removed. Mercer was relieved to discover that his segment was in good shape, pleased that Neilson thought him something less than wasteful of its power reserves and surprised at the multiplicity of activities of the other officers during the times when Mercer had thought that he was the only one doing any work—reassuring the passengers had been a very small job compared to that of organizing their rescue.

When the bandages and pads were off Collingwood kept his eyes closed while Neilson went on speaking.

Perhaps he was asleep at last, Mercer thought, or maybe he was just afraid to look in case there was nothing to see.

"If opening your eyes feels as if it might hurt them," Mercer said, "don't do it. We're turned away from the sun and the only light is coming from a pod about a half-mile away, so it may be too dim for anything at all to register—"

Collingwood opened his eyes

then. In the dim light the whites looked almost as dark as the irises —they were still bloodshot—and smeared with cream. Mercer saw them twitch from side to side, then up and down. The captain sighed and closed them.

"I can't stay awake any longer," he said, "and Prescott is doing all the right things. But a word of advice, Mercer. Before you meet him again, shave—and for God's sake put on some clothes—"

Neilson's sigh of relief warmed the back of his neck as Mercer began replacing the dressings, and the mental picture that he had been seeing of an ex-Captain Collingwood, blind and with a lung burned out and probably cancerous, being led around by his beautiful young wife until she became his prematurely aged widow, faded away.

Suddenly he laughed and said, "He can *see*."

"Yes," said Neilson, "but we're due to decelerate in three minutes. You know the drill."

AT FIRST Mercer was sure that Prescott had directed them to the wrong pod, one that was already marked empty. But when he opened the seal he discovered that the life-support system must have packed up only a few minutes earlier and that the pod's interior was filled with a dense, stinking fog. He had to grope through the weightless welter of plastic screens, clothing and other drifting debris for something that would feel like a human being. He found two of them near the services panel and pushed them gently toward the seal at the opposite side of the capsule.

The third survivor found Mercer, wrapping his arms tightly around his neck from the back like someone drowning. The breathing mask was knocked away from his face and suddenly Mercer was drowning, too, in air that had to be too foul to support life. He lost his bearings and presently could not even guess where the seal was. He kicked hard against anything solid or near solid with which he came in contact, sending his passenger and himself bouncing blindly between the plastic walls of the pod, and by sheer luck he found himself tumbling into his own segment, which was by then also filled with stinking fog.

A few minutes later, while the active survivor was helping Mercer resuscitate the other two, Neilson put in his head and shoulders to say, "Prescott has another one for us. We're already lined up. Seven seconds thrust, five seconds countdown. Your mouth is bleeding, Mercer."

While Neilson and Mercer emptied three more pods, the Mathewson boy in Fourteen was given his marker stars and thrust timing. Fifteen and Sixteen were timed to arrive a few minutes later. When they came aboard the last batch of passengers said that Mercer's segment smelled worse than the pod they had just left, that it was much hotter as well and had he anything to eat? Mercer told them that talking wasted air and tried to find a place for them where they would not be in the way during the next rescue operation—the last rescue operation, Mercer was sure, because his segment and its services

were becoming dangerously overloaded.

Neilson had locked his control panel against accidental activation and placed three passengers in his segment. Two more drifted between the connecting seals, their feet in the engineer's vehicle and their heads in Mercer's segment. The bunks now held eighteen and the spaces between accommodated another two. Neilson and Mercer were pressed against a canopy that was virtually opaque with condensation.

From time to time they rubbed it with sweating hands to search the blurred stars for the recovery ship. Despite everything that Mercer told them about conserving energy and air, the passengers were beginning to argue and push and ask why two of the bunk sides were still up when all the others were down and contributing their quota of air to the rest of the passengers. The occupants of the bunks, whose original sedative shots were beginning to wear off, had begun to complain about being hot and cramped and unable to breathe while the people outside were angrily offering to change places with them.

"Those two bunks contain patients as opposed to mere survivors," said Mercer sharply.

"Neither of them is pleasant to look at and one of them, the captain, is slightly radioactive. . ."

He went on to describe the captain's injuries in detail, the recovery of his sight and his poor chance of survival if some method of removing the two specks of radioactive material in his lung were not discovered within the next few weeks. Medical facilities on board the recovery ship would be no better than those on *Eurydice*—and if Collingwood could not be treated soon he would probably outlive the voyage by only a couple of years.

As he continued talking Mercer knew that he had their undivided attention and realized once again why morale was always good in a hospital ward—suffering shared was suffering halved and someone always seemed in poorer shape than oneself. Mercer was also doing his best to take the survivors' minds forward to the time when they would be in the recovery ship and past the time in the not too distant future when the ship might or might not arrive.

There was an interruption.

THE first officer was trying to give them something else to think about as well.

"Prescott. Switch on your pod frequency, Mercer."

Mercer pushed between two passengers to do so and heard the Mathewson boy's voice.

"—didn't answer last time because Mr. Prescott said you were busy with passengers, but you can talk to me now. Pod Fourteen retro burn complete and I can see two other pods—"

"Prescott. We have him."

"—and one of them is all white. What do I do now, Mercer?"

"Nice shooting, Mathewson," said Mercer warmly. "We have you in sight. Your orders? Well, keep a sharp lookout for the recovery ship, but don't look at or near the sun without goggles. Acknowledge, please."

"Pod Fourteen. Will do."

But the concern of the passengers for the captain and their relief at the Mathewson boy's safe arrival in the rendezvous area were short-lived. Soon they were saying that the boy was lucky to have a pod's air and food supply all to himself, that the recovery ship was not coming, that it would be impossible to see it if it did come with the canopy fogged with condensation, that it was hot and that if some unprintable didn't keep his feet out of someone else's mouth he would get them bitten off.

"You must understand," said Mercer, trying not to gasp between words, "that we and the other pods and segments are following our original course for Ganymede and will arrive exactly on time. The recovery ship is virtually identical to *Eurydice* except for the extra boosters that will enable it to catch up with us and decelerate to match our velocity and which also make it impossible for it to be manned—no human being could survive the enormous acceleration. These boosters are very powerful and if they are fired in the rendezvous area we, or some of us at least, might suffer even more from the heat they generate. So the recovery ship has got to feel its way in, guided by the first officer, and the time of arrival is dictated by considerations of survivor safety. It could be only minutes away, or a couple of hours. Isn't that so, Neilson?"

The engineer rubbed at the canopy condensation with one hand. Three fingers were outspread with the thumb bent inward, indicating three, possibly three and a half hours.

Aloud he said, "That is an oversimplification, Mercer, but essentially correct."

His expression, which only Mercer could see, was sayig: *Lies, all lies.*

Three or more hours, Mercer thought. He asked, "And we have ample air and power to last out?"

"Yes, of course," said Neilson, but his expression had not changed.

Nobody spoke for a few minutes, but Mercer knew that they would speak soon. He wiped sweat from his forearm and saw fresh globules grow seconds later. He had never been a compulsive extrovert, had never enjoyed the shouting, sweating proximity of his fellow men. He knew with an awful certainty that he could not take much more of the present situation and that he would probably be the one who started the chain reaction of violence for the simple reason that he had either to get out of this or end it.

The heat and humidity were worse in his segment than they had been in many of the pods he had entered. He could understand how Kirk and Stone had felt, although their original reason for fighting had been much stronger, if not better, than his. He had to get out or he wanted all the other quarreling, stinking people to get out.

He suddenly realized that he could put them out, although not literally.

"Mr. Neilson and I will have to sweat it out," Mercer said, forcing a laugh so that they would all know that he was making a joke. "But

there is no necessity for the rest of you to share our discomfort. What I am proposing is not in accordance with company regulations, of course, which state that medical stores should be used only on passengers who are ill or injured. Apart from being hungry and a little short of breath there is nothing wrong with you people, but you would be still more comfortable if—"

"If the air is so scarce," said a man beside him in a voice close to hysteria, "why the hell are you talking so much?"

MERCER closed his eyes, fighting a sudden and incredibly violent urge to batter the hateful, unshaven face and hunger- and heat-emaciated body until it looked like the two he had left in Pod Three. But he knew that once he started he would not be able to stop with this one stupid, sarcastic passenger—he would go berserk among them until all were quiet and probably all dead. He wondered why he was having these intensely violent thoughts, was once more assailed by the heat and the stench and the sweaty pressure of bodies all around him and decided that he was in hell and that in hell everybody acted like the devil.

"If I talk everyone else listens, sir," he said, opening his eyes, "and that saves more air than if everyone talks. What I intend to do is give some of you the opportunity of taking special shots—a form of mild sedative, really, that also opens the pores and makes you feel cooler. I will use a spray injection hypo, which is quite painless. If you'll give me just a moment I'll demonstrate—"

Not all he told them was a lie, assured himself cynically. The shots were painless and the recipients would feel cooler and more comfortable because they would be out cold for the next three hours. And if he pretended that there were not enough shots to go around and that he was doing them a favor they might not resist the idea until it was too late. Certainly the first three did not resist, possibly because he had led them to believe that he was still demonstrating the painlessness of the procedure and nothing else. Still talking reassuringly, he injected any arm or thigh that presented itself.

He looked at Neilson, who nodded and wriggled alongside him and began moving the suddenly relaxed bodies out of the way, holding the ones who argued or tried to break free and closing bunks so that Mercer could reach the passengers in the lower tiers.

Only one passenger, the last one of the three packed into Neilson's segment, put up any resistance.

She said, "We're not going to wake up again, are we?"

"No, ma'am," said Mercer, "at least not in here." Silently he added, *We hope. . .*

A few minutes later Neilson gently cleared the space above his panel of drifting bodies and said, "Putting them out was a good idea, Mercer. I've rechecked my calculations and provided we don't waste air in needless discussion, we might just make it."

"Fine," said Mercer.

"I'm not trying to tell you your

job, Mercer," he went on, "but you might have to use a little energy checking that these sleeping beauties don't drift too close to each other and smother. Or have you that under control?"

"Yes."

"It's hot."

"Yes."

"About the captain, Mercer. I should have told you earlier, but the passengers were so interested in his troubles that I didn't want to spoil things for them. We reported what you said about his condition before *Eurydice* blew and the recovery ship will be carrying the special instruments you need to operate on him and withdraw the radioactive materials."

"That's great."

"Prescott will be acting captain for the rest of the trip out and back —Collingwood won't be able to assume command again until he has passed the Earthside medical. Prescott should have been captain anyway, but the company thought that he lacked charm for a passenger-ship skipper and put Collingwood in with Prescott to keep him right. The captain was strictly a station shuttle man—a nice person, but the situation wasn't fair to Prescott. He is tops in this profession, but he needs something—"

"A good PR man?"

"Yeah. But we shouldn't waste air talking all the time."

"You are doing most of it."

"Listen, Mercer, are you asking for a punch in the—"

"Prescott. The remaining pods seem to be in no immediate danger with the exception of one. There is a life-support system failure with toxic wastes escaping into the living space. This is an urgent one, Mercer. Can you squeeze in three more?"

THE three survivors were sedated just as soon as Mercer was sure that they were still alive. Then he burrowed and pushed until he found spaces for them and returned to the canopy to rest for the effort of burrowing in again a few minutes later to make sure that nobody was smothering. That effort increased the heat being generated inside the segment and the precaution did not seem to be really necessary. Twice he nearly passed out and once he almost panicked. Only the thought of Kirk as he had last seen him saved Mercer from tearing and kicking at the bodies pressing in all around him.

In a way Kirk's reaction had been normal. He had known that he was going to die and had decided to enjoy himself first. But the hot, intimate contact of flesh did not stir Mercer even though, like Kirk, he was sure that he was going to die shortly. He began to wonder why—was something wrong with him? But then he began to realize that all there was wrong with him was a recently contracted and serious case of monogamy—the only close contact he wanted or would enjoy would be with the patient in bunk Three.

He did not go among the passengers again, but stayed close to the canopy, fighting for every breath and sweating from every pore. *This atmosphere is unsuited to human life,* he told himself, *so why don't we all die?* But they did not die and

some of the passengers seemed to be moving, waking up—but it was only Neilson pushing his way through to the canopy.

"I thought it might be cooler here," he said. "It isn't."

Mercer wiped at the plastic without speaking.

"I feel like a living fish in a can of sardines," said Neilson, then added: "Sorry, I'm talking."

The silence stretched for a sweating, stifling eternity and when it was broken the voice was not using the segment's precious air.

"Pod Fourteen, Mathewson. Come in, Mercer."

The voice was without expression, just like that of a real spaceman in an emergency. Mercer wondered what had gone wrong in Fourteen and if he could squeeze in one more. It would have to be a bad emergency for the medical segment to be a sanctuary, but it was only right that a mother and son should be together at the end.

"Mercer," he said.

"I—I have visual contact with the recovery ship, Mercer."

"Prescott. Confirmed. MacArdle will have the figures for you in—"

They lost Prescott for a few minutes then because the Mathewson boy had lost control and was whooping like an Indian, and Neilson and Mercer were joining him.

XXI

THE recovery ship differed from *Eurydice* in that it had two passenger locks aft instead of one, a feature designed to speed the reembarkation of survivors. Neilson nudged Mercer's segment against one and used the other to dock his own vehicle, but it was a very close thing. Mercer's head was pounding and throbbing and black splotches were blotting out his vision when he hit the quick-release on his seal. Then the hot, putrid air was rushing past him and cool, dry air began seeping back. He crawled out, shivering, to find Neilson already waiting for him.

"We'll have to go after the others as soon as possible," Neilson said briskly. "Do you mind if I don't help you unload this bunch? If I can concentrate on replenishing your segment with power cells, air tanks and fuel cartridges we could be ready to go in thirty minutes."

Mercer nodded. He began moving out the sleeping passengers and floating them carefully into the main compartment, which now seemed to be enormous. He began with the people in Neilson's segment because it had to be jettisoned to allow Prescott, who was estimating contact with the recovery ship in twenty minutes, to dock. MacArdle and his passengers were due a half-hour later, by which time Prescott's segment would have been turned loose. Mercer's vehicle was the one designed for fast rescue work as long as there was at least one trained astronaut aboard to fly it.

The last two people he moved out were the captain and Mrs. Mathewson—these he took up to sick-bay. The place gave him the strangest feeling of disorientation because it was exactly the same as the place he had just left except for its fresh, newly minted look. On

his way he saw the people drifting about the passenger compartment showing signs of animation. He checked his dive, letting Mrs. Mathewson, and these he took up to slowly ahead of him, while he spoke to them.

The manual had told him what to say. He had read that particular section over and over again during the past two weeks as he might have scanned a fairy story he had never expected to come true.

"Your attention, ladies and gentlemen," he said. "As you can see, your couches are already arranged in cruising mode and numbered as were the positions in *Eurydice*. In the usual compartments you will find food and fresh clothing. Will you please go to your original couches, strap in, talk as much as you want to, but keep the center of this compartment clear. For the next few hours the ship's officers will be bringing in the remaining survivors and doing other necessary jobs and you may feel that you are being ignored, but things will soon return to normal.

"By the day after tomorrow," he added, smiling, "I may even be able to arrange a swim in the tank."

When he had completed his check on the captain, he replaced the blankets removed during the superheated period in the other segment and immobilized Collingwood with webbing. The bunks were not cold, but the feel of blankets would give a sense of security and Mrs. Mathewson certainly needed that.

She came to just as he was about to slide back her bunk. She began to struggle against the webbing and blanket with increasing violence. Instinctively he put out his hands to restrain her—then he remembered the position and severity of some of her bruises and reached for the hypo instead.

"Take it easy, ma'am," he said gently. "You're safe now."

She stopped struggling and asked, "Mercer?"

"Yes, ma'am."

He knew that he should sedate her quickly before she had a chance to think, to remember. But she could not go through the rest of her life under sedation and it was important that she should try to face those ugly memories as soon as possible—not completely, of course, but in easy stages. He desperately wanted to see her reactions, to get some idea of whether or not she would be able to handle it, before he used the hypo. Neilson hadn't called him, so there was still a little time before he had to leave.

"Bobby?"

"He's safe, too, but still in his pod. You must understand that having it to himself means he won't run out of air as quickly as the others. We have to bring him in last, ma'am."

"I know. You could give him no preferential treatment. You acted as if he were a man."

"He did a man's job, ma'am, and when he cried like a frightened little boy for his mother I pretended not to hear."

"And you brought him back. I'm grateful. I might not sound it—but I am. You treated him exactly right, said all the proper things—to all of us, not just to Bobby. You

were always cool, calm and—and nothing seemed to touch you or change you in any way. I suppose I should be glad—we should all be glad—that you weren't an overly-sympathetic character—"

AS SHE fell silent Mercer thought that clinically he was very pleased with her reactions, but that on the personal level he was coming off very badly. He wished that he could relax and stop radiating the composure he most decidedly did not feel.

"I'm not supposed to display signs of weakness in front of the passengers," Mercer said irritably, "and especially not before my patients, but if you knew me better you would realize that I could be quite bad tempered at times—and jealous and very, very angry in certain circumstances—"

"I'm sorry, Doctor," she broke in. "I don't know why I'm picking on you like this." She put her hand out of the blanket and gripped his, the one that wasn't holding the hypo. "Don't put me out again just yet. I'm picking on you because I can't get nasty with myself—at least, not out loud. When you were talking to us back there I could tell that you were sometimes angry and that you couldn't afford to show it because everybody else was listening and would have known what was going on in Three. But you knew and you made Kirk and Stone mad at you because you were like an amplified voice of conscience. You kept heading them off, talking sense, lecturing them. If it hadn't been for you it would have happened much sooner. Are they both—both—"

Her grip was so tight that his fingers were turning white. He nodded.

"Maybe I should not have been so hard to get," she went on, but pleading with him with her eyes to argue and disagree with everything she was saying. "These days nobody would have worried, would they? And you would not have talked about it. But they were strangers, just like my husband was several different kinds of stranger before he died and all the different strangers wanted to make love to me. And it was so open out there, so clean and bright and empty that I couldn't—it would have been like sinning in heaven." She paused, looking away from him. "But I could have forced myself and once I almost did. If they had had me they might not have started fighting."

Mercer shook his head. "Then I would have had to lecture you—at very inconvenient times—about the need to avoid generating heat."

Still she would not look at him as she said, "After he knocked me out—what happened?"

"Nothing much," said Mercer. "He became angry and frustrated—very angry and extremely frustrated from what I could hear—and I was listening very carefully, you understand. Then he collasped and died from heat-stroke a few minutes later, leaving just enough air to keep you alive until I arrived. But you should try to forget all about it, you know. It's over. And you've a grip like a wrestler, ma'am. If I'm to perform any more

miracles of surgery you'd better not break my fingers."

"You aren't telling the truth," she said angrily, still without letting go. "You know it is important to me and you just want me to think—"

"It's important to me, too," Mercer broke in quietly. "Not vitally important, you understand, but still important enough to make me glad that I'm not lying."

"I'm not sure that I understand you," she said, but her expression said that she did and her grip on his hand eased. She added: "Will I have to tell people about it? Will there be an investigation?"

"Not unless you want one," said Mercer. "As far as I'm concerned I don't really know who did what to whom. Both men were unrecognizable when I got to them and once I knew that they were dead and you weren't, I couldn't waste time reconstructing the crime. If you like I can say, quite truthfully, that one died from asphyxiation and one from heat-stroke. That isn't the whole truth, of course, but I'm thinking about Mrs. Kirk's feelings as well as yours and Bobby's—and even you don't know for sure what happened at the end. Nobody has jurisdiction in space-wreck incidents like this, so there is no point in talking about it if you don't want to. The only people who would be interested are the news media folks, and they—"

"No," she said firmly.

"I didn't think you would want that," he said, bringing up the hypo. "So just try to forget the whole thing for the time being and sleep. And let go of my hand. You'll be in this bunk until your cracked ribs mend, so you can expect to see a lot more of me—"

He stopped because she was laughing and wincing because laughing must have been hurting her ribs.

"Is that possible?" she said.

Mercer smiled in return. "I can't answer that, ma'am, until you are completely recovered. There are rules about doctor-patient relationships, you know."

Before she could reply he had tucked her bare arm under the blanket and closed the bunk.

She had made him aware for the first time in two weeks that he was improperly dressed, that he was not even wearing a cap like Neilson and that they were no longer in an emergency situation in which such lapses could be excused. He still had a few minutes to spare before the engineer needed him, so he shaved, climbed into a set of clean uniform coveralls and used the canopy plastic to check that his cap was straight. The sooner everything returned to normal the better, he thought as he turned to go.

"NEILSON. I will need you in ten minutes, Mercer—this took a little longer than expected. Prescott is back on board and wants to see you in the control-room."

"Mercer. Ten minutes."

The first officer was in Neilson's position, going over the engineering telltales. He looked at Mercer slowly from head to toes and shook his head.

He said, "Before you leave to pick up the rest of the survivors I

want you to remember that there will be an inquiry when we get back to Earth into the *Eurydice* disaster and the proper functioning or otherwise of its survival equipment. Neilson, MacArdle and myself will be responsible for the technical evidence and you will deal with questions regarding the effects on passengers. You will also have to give medical evidence regarding the deaths of Kirk and Stone."

"Heat-stroke, asphyxiation and heart failure," said Mercer.

Prescott nodded. "Mrs. Mathewson's story might not agree with yours and, while I realize that she will not be returning to Earth, it could be awkward if—"

"She wants to forget about it and so do I," said Mercer firmly. "That was my professional advice as well. There is also the fact that the media, if they got their hands on it, would be sure to imply all sorts of things which did not in fact happen. You see, both men were in such a mess that I don't *know*, from my very brief observation of their bodies, who killed whom. It is possible, although not likely, that Stone made a comeback after Mrs. Mathewson was knocked out—so even she can't be sure. Then there are the possible effects on the boy of reading that sort of stuff about his mother—or finding out about it in later life. She won't talk about it, you can be sure of that."

Prescott looked relieved, but not completely. He said, "That's good. I told Mrs. Kirk about her husband on the way in—I said that his death was due to excess weight making him vulnerable to the heat and low oxygen content of the air. She could suffer, too, if it got out that he died fighting over a woman. But I'm more concerned about you, Mercer, and what you may say when we get back. We are all going to be heroes, you especially. You could earn a lot of money from the media simply by telling the truth as you know it. And I couldn't really blame you—especially since you only wanted space experience to land a good research job on Station Three—"

"If you don't mind," said Mercer, "I would like a little more space experience—of a less dramatic nature, of course. And in any case I am more interested in a job on Ganymede Base now. I don't want to embarrass the Mathewsons—or Mrs. Kirk—so if I can stay with the ship and toe the company line during the inquiry—"

"I'll be captain," said Prescott.

"You almost dissuade me."

"I wasn't trying to do so," said Prescott quietly. "Just trying to give you fair warning that I am a consistently nasty person who is unlikely to change anything but his uniform."

"Neilson. We'll be ready to go in three minutes, Mercer."

As he turned to go Mercer wondered if he would change very much. He was thinking of a boy who had played spaceman for two long and dangerous weeks and of his mother who would soon have him with her again. He had helped to save the lives of both and he was beginning to feel responsible for them in an oddly possessive way and the voyage was less than three weeks gone. It was a silly question because he had already changed in many ways. ★

(Continued from page 66)

But you have no recourse when you meet a disinterested man, and that's me." He sighed. "Trouble is that you've paid us too well. There could be an awful hoo-rah about it, people swarming in." He pushed the hee-haw button and the pammas never moved.

"I think I've got it." He had never been an indecisive man, though always irresolute in his own peculiar way. He wrapped the FLR carefully and put it into his pocket. "Well, somebody's got to be responsible," he said. "It always, invariably and forever comes down to one man. The best gift I can give you is to leave you alone."

The pammas sat like old avocados and said nothing.

THAT evening he spoke to the assembled class. He sent people off to a dozen cities. When they returned next day, each with a cargo module, all the burros and trailers and campers were loaded. Rohnagan kicked aside his path to the spring.

The foundation lifted from Edris with all the modules in lock and everyone crowded into the foundation. No planetary communication band was open. At the bare minimum altitude they kicked to Interface alignment and punched an autotape for Brummigen. They landed at a bonded port and dispersed.

Two weeks later the class in Advanced Field Exploration met for the last time in the security field house on Geology plateau. It was a dome building the School of Architecture used as a horrid example in their sneer tours of College Station. Rohnagan stood in front of the class and tapped his pointer on the floor. The hubbub faded. He left the projection on the screen.

"There will be no written financial report except on an individual basis for a particular purpose," he announced. "As you can see from the summary of sales, yours has been an extraordinarily profitable class. None of you assigned income, but if you had, the twenty-five percent of one pro rata share would pay for the education of a moderately intelligent man. I don't know if this has been the most remunerative class on College Station. What I do know is, all of you are modestly in the chips."

While the class cheered, he took the financial summary from the projector and dropped it into the disposal slot.

"For those who may have forgotten the principles of pragmatic mineralogy, the reason you have received personal vouchers instead

of direct deposits is a truism of mining and in the nature of the occupation. To wit—it's sometimes wise to have an unknown, unattachable account."

Laughter.

"I have assigned half the storm jewels and blush pearls to various colleges and museums on College Station. The other half is still in appraisal. A further dividend will be sent to your addresses of record in the next six months. If anyone would like to sell his interest now it will have to clear through me. My minimum bid for one full share is ninety thousand."

Cheers.

"The certified individual financial report I mentioned will be necessary if you want to return to Edris. I don't recommend it. The Bahia cities are extremely hostile to every individual here on an individual basis. The export duty and penalties would have to be paid. I ordered locally illegal take-off because of the difficulty of appraisal and the inevitable delay in payment. Many years ago I found oweins and ended up with roughly fifteen percent of their finished value after eight years. Questions?"

"That's why the conditioning?"

"It was inadvisable to go as a class, yes."

"We were conditioned not to squirrel stuff ourselves," said Gurchie Gronewald. "Without prejudice now, Tom, did you bring back anything? We know about the storm jewels—fantastic! But did you or Nan or other staff hide stuff? I'm not complaining, dammit, I'm curious is all—"

"I brought back an FLR as a personal souvenir," said Rohnagan. "Here it is. Anybody want to bid on it? We'll split the proceeds." He grinned as Alf Swinney and two others sat on Gronewald. "Other questions?"

"Will you go back to Edris?"

"No. 'All them little eyes?' "

"Can we enroll again in two-twenty?"

"Certainly. Keep in mind, this has been exceptional."

"What planet next class, Tom?"

"I don't know. I'm going to school myself. Won't be teaching."

"What are you going to take?"

"Pragmatic ethics."

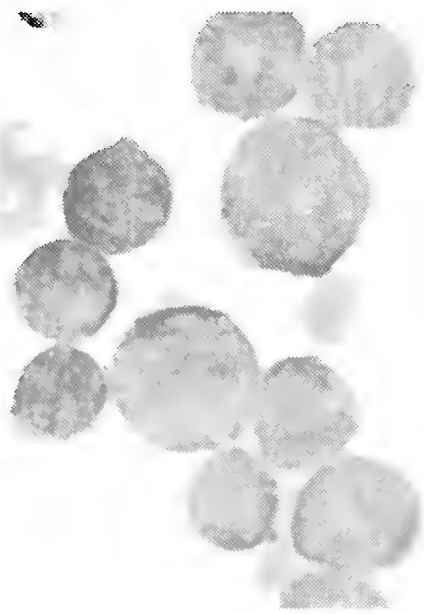
"What for?"

"I want to be good." He grinned. "Class dismissed."

The FLR in his pocket turned cold. It was a temperature variable stone. Maybe it responded to the phases of the moon. Maybe it was a compass to good. And by whose standards? How congruent, how universal was good?

"Good question," he told himself, and accepted an invitation to the class party. ★

We're close to a cure for leukemia.



The enemy.

A year ago, we wouldn't have dared say that. Not with that beautiful word "cure" in it.

"Temporary remission", yes. New forms of leukemia treatment were helping some children stay alive a little longer. But that seemed to be all that medical science could give them. Another few months. Another birthday or two.

Now we're seeing something that's almost too good to believe. A whole crop of kids who are alive and well 5 years or more after getting a new kind of drug therapy. And after 5 years, cancer researchers begin to hesitatingly, hopefully, talk of a permanent "cure."

Leukemia is cancer of the blood. Before you have a cure, you have to destroy every last cancer cell in the bloodstream. The new treatment is a *combination* of different anti-leukemia drugs, so that, hopefully, any cells missed by one drug might be killed by another.

It seems to work. We're still holding our breath, but it really seems to work. The 5-year survivors that gladden our hearts today are the result of combination treatments begun in 1964. And work has been going on feverishly ever since. Each year, the children who get leukemia have a far better chance of cure than those of the year before.

The American Cancer Society plays a vital part in this exciting work. So, when our volunteer comes to your door this month, be generous. Especially if you have children. Or grandchildren.

American Cancer Society
We want to wipe out cancer in your lifetime.

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